

**BUCK 13 TIMBER SALE
ENVIRONMENTAL ASSESSMENT
EA# OR-014-07-02**

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
LAKEVIEW DISTRICT - Klamath Falls Resource Area

ABSTRACT: The following Environmental Assessment addresses the environmental effects associated with a variety of proposed treatments from the Buck 13 Timber Sale. Proposed treatments include; commercial timber harvesting, road improvements, riparian habitat restoration, aspen restoration and fuels treatments.

FOR FURTHER INFORMATION CONTACT:

Shane Durant
Klamath Falls Resource Area, BLM
2795 Anderson Avenue, Bldg. 25
Klamath Falls, OR 97603
541-883-6916

FREEDOM OF INFORMATION ACT AND RESPONDENT'S PERSONAL PRIVACY INTERESTS: The Bureau of Land Management is soliciting comments on this Environmental Assessment. Comments, including names and street addresses of respondents, will be available for public review at the above address during regular business hours. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in their entirety.

Table of Contents

CHAPTER 1 – INTRODUCTION.....	1
Proposed Action.....	1
Location.....	1
Purpose and Need for Action.....	4
Desired Future Condition and RMP Objectives.....	5
Environmental Analysis and Decision Process.....	6
Public Input Summary and Issue Development.....	6
Management Direction and Conformance with Existing Plans.....	11
CHAPTER 2 - PROPOSED ACTION AND ALTERNATIVES.....	11
Proposed Action.....	11
No Action Alternative.....	14
Other Alternatives Considered But Dropped From Analysis.....	14
CHAPTER 3 – AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES.....	15
Introduction.....	15
Vegetation – Affected Environment.....	19
Vegetation – Environmental Consequences.....	20
Terrestrial Wildlife Species – Affected Environment.....	28
Terrestrial Wildlife Species – Environmental Consequences.....	31
Soils – Affected Environment.....	36
Soils – Environmental Consequences.....	39
Roads – Affected Environment.....	41
Roads – Environmental Consequences.....	41
Hydrology – Affected Environment.....	42
Hydrology – Environmental Consequences.....	42
Aquatic Wildlife Species – Affected Environment.....	45
Aquatic Wildlife Species – Environmental Consequences.....	46
Livestock Grazing Management – Affected Environment.....	47
Livestock Grazing Management – Environmental Consequences.....	47
Cultural Resources – Affected Environment.....	48
Cultural Resources – Environmental Consequences.....	48
Recreation Resources – Affected Environment.....	49
Recreation Resources – Environmental Consequences.....	49
Visual Resources – Affected Environment.....	50
Visual Resources – Environmental Consequences.....	50
Socioeconomics – Affected Environment.....	51
Socioeconomics – Environmental Consequences.....	51
CHAPTER 4 – CONSULTATION.....	52
Endangered Species Act Consultation.....	52
CHAPTER 5 – LIST OF PREPARERS.....	52
Appendix A – Bibliography.....	53
Appendix B – Summary of Best Management Practices and Project Design Features.....	57
Upland Forest Vegetation - Harvest Prescription.....	57

Roads.....	58
Soil Resources.....	58
Hydrology & Riparian Reserve Treatments.....	59
Wildlife Terrestrial Species.....	60
Noxious Weeds.....	62
Special Status Species.....	62
Cultural Resources.....	62
Visual Resources.....	62
Recreation Resources.....	63
Appendix C – Silvicultural Prescription Buck 13.....	64

List of Tables

Table 1: Detailed Description of the Proposed Action.....	13
Table 2: Projects completed 1998 to present on BLM lands in the Spencer Creek Watershed...17	17
Table 3: Additional Actions Proposed on BLM lands within the Spencer Creek Watershed.....18	18
Table 4: Special Status nonvascular plant species that could occur in the project area.....20	20
Table 5: Species by habitat type in the project area possibly affected by the project actions.....29	29
Table 6: Spotted owl suitable and dispersal habitat available in the Spencer Creek Watershed...30	30
Table 7: Spotted owl habitat removed since 1994 within the Spencer Creek Watershed.....32	32
Table 8: Suitable habitat affected by additional actions proposed on BLM lands within the Spencer Creek 5th Field Watershed.....33	33
Table 9: Summary of impacts to spotted owl habitat in the Spencer Creek Watershed.....34	34
Table 10: Soil Types and characteristics of the Buck 13 treatment area.....37	37
Table B-1: Riparian Reserve Widths.....59	59

List of Figures

Figure 1 – Location and Fifth Field Watershed Map.....	2
Figure 2 – Proposed Project Map.....	3
Figure 3 – Density Management Take versus Leave Trees per Acre Buck 13 Timber Sale	21
Figure 4 – Matrix Regeneration Treatment Take versus Leave Trees per Acre Sale.....	22
Figure 5 -- Existing Snags.....	24

CHAPTER 1 - INTRODUCTION

The Klamath Falls Resource Area Resource Management Plan (RMP) provides direction for managing lands on the western part of the Lakeview District. The Buck 13 Timber Sale Environmental Assessment (EA) will analyze the effects from proposed vegetation treatments and other management actions in and adjacent to the Buck 13 Timber Sale project area on Bureau of Land Management (BLM) lands shown on the Location Map (Figure 1). Most of the forested area in the proposed Buck 13 Timber Sale area contains multi-aged, multiple canopy stands. In general, the stands proposed for treatment have a residual large tree overstory component of white fir and ponderosa pine. Past management practices in the area have included grazing, timber harvest, suppression of fires and limited recreation.

Proposed Action

The following activities in the various Land Use Allocations (LUAs) are included in the Proposed Action (see Chapter 2 for a detailed description):

Commercial Timber Harvest within the Matrix LUA – approximately 15 acres – Regeneration Harvest (harvesting all conifers except 16 to 25 large green trees, see this EA pages 11 and 12), ground based yarding operations, reserving 16 to 25 large green trees per acre, reforestation of openings with ponderosa pine, Douglas-fir and western white pine (if available)

Fuel Reduction in the Matrix LUA – approximately 15 acres – whole tree yarding, hand and/or machine piling of slash concentrations, lop and scatter of logging residue, burning of piles, and very low intensity underburning if fuel loads allow

Vegetation Treatments in Riparian Reserve LUA – approximately nine acres – Density Management (thinning from all diameters, see this EA page 12) and culturing around large pines, ground based yarding operations

Fuel Reduction in Riparian Reserve LUA (outside of aspen treatment area) – approximately nine acres – whole tree yarding, hand and machine slash piling of slash concentrations, lop and scatter of logging residue, burning of piles

Aspen Restoration in Riparian Reserve LUA – approximately five acres – removal of all encroaching conifers up to 24 inches diameter at breast height (dbh), piling and/or broadcast burning of conifer slash in aspen restoration portion of riparian reserves, deferring grazing for at least three years

Prescribed Fire:

- medium intensity underburn and/or pile burning in the aspen restoration area would be used to stimulate aspen sprouting and reduce fuels – approximately five acres

Road Treatments:

- road improvement (spot resurfacing) - Approximately 1,200 feet
- maintenance/renovation (grading, ditch cleaning and other general maintenance) - Approximately 1.2 miles
- no new construction of permanent or temporary roads

Location

The proposed project area is located approximately 14 miles northwest of Keno, Oregon and approximately ½ mile south of the Clover Creek County Road (see Figure 1). All treatments

proposed in this environmental assessment would occur exclusively on BLM-administered lands within the Klamath Falls Resource Area. The BLM lands proposed to be treated are located in Township 38 south, Range 5 east, Section 13, Willamette Meridian.

Figure 1 – Location and Fifth Field Watershed

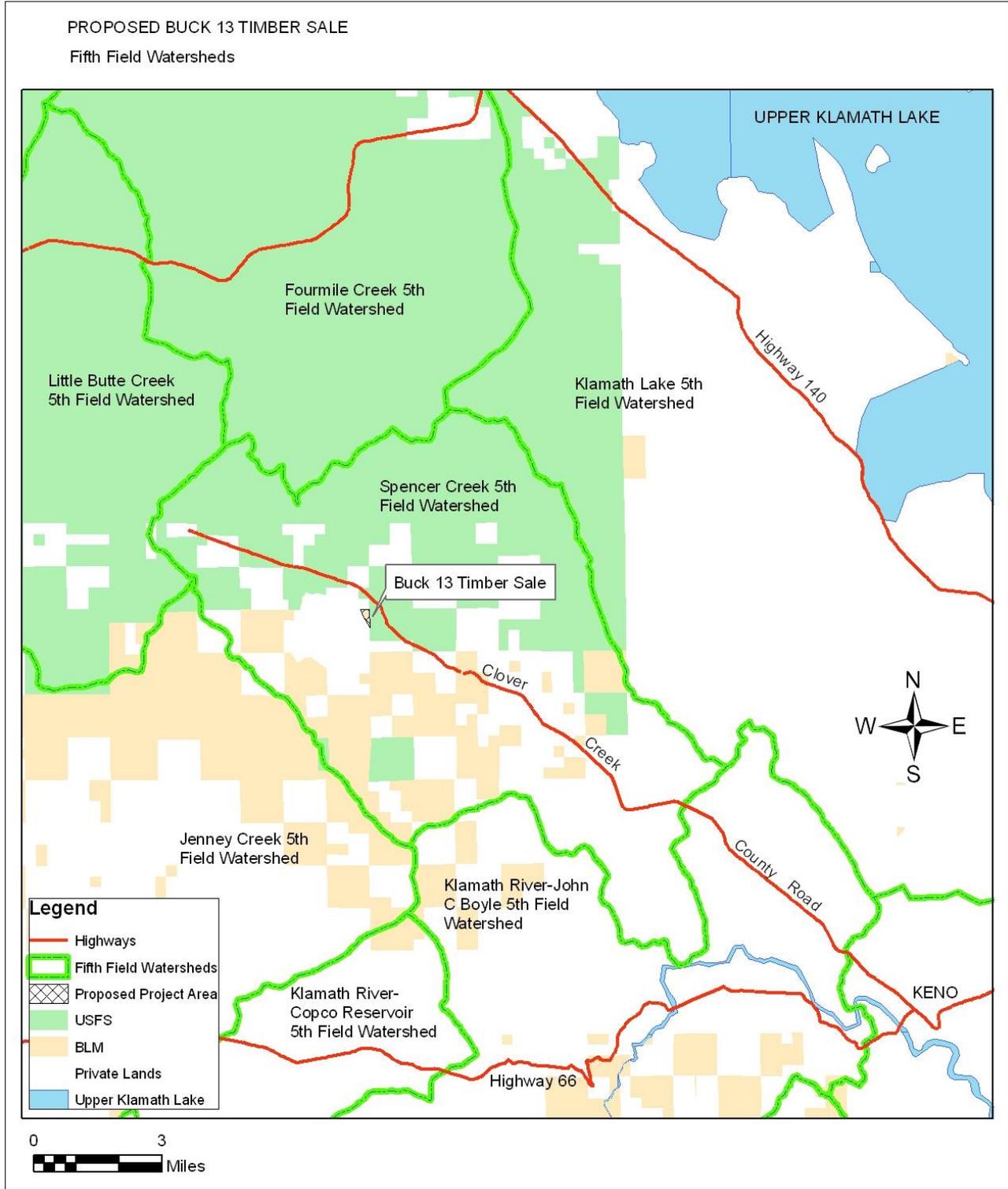
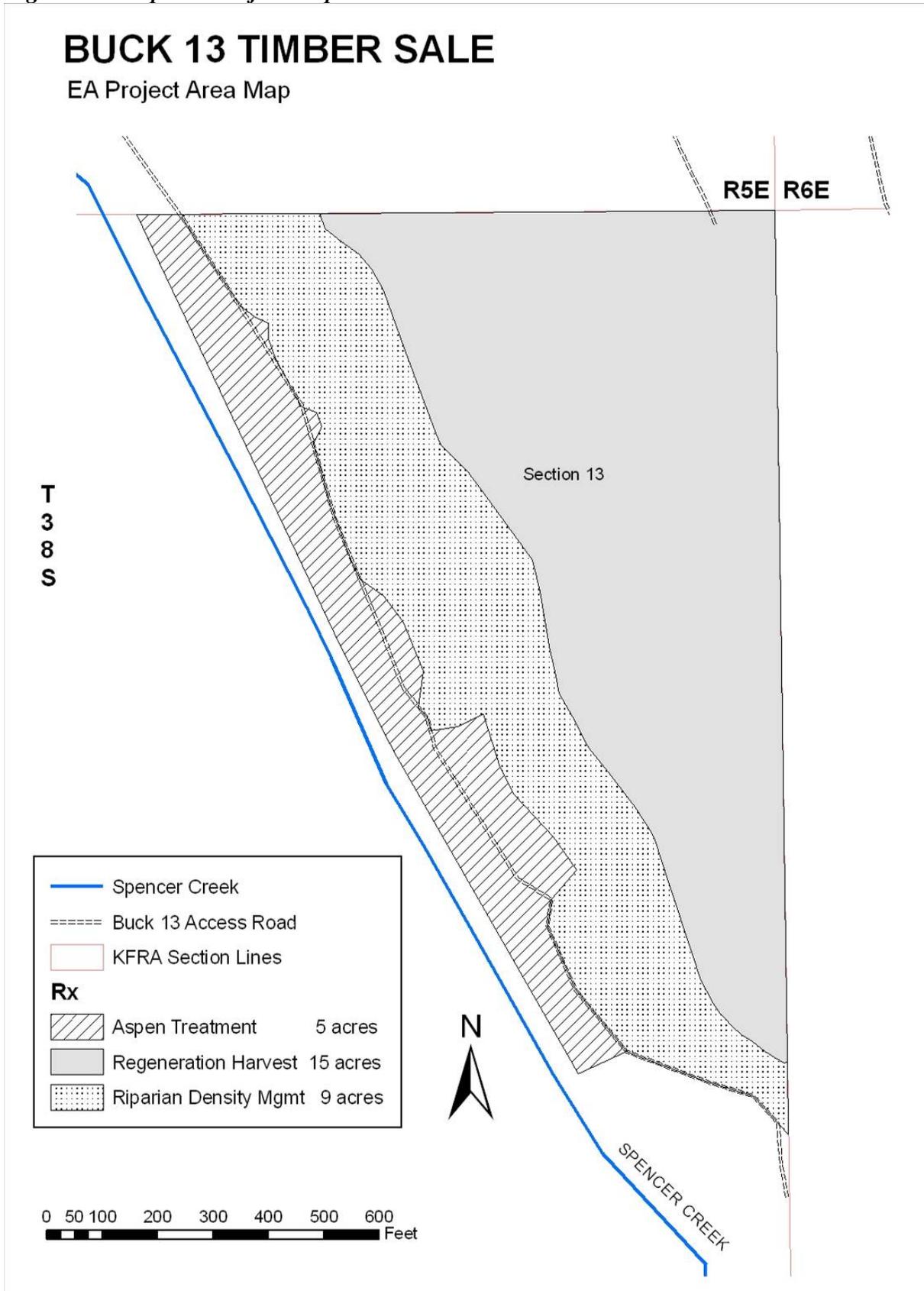


Figure 2 – Proposed Project Map



Purpose and Need for Action

Purpose

- Implement actions to meet the objectives of the RMP as discussed below.
- Improve the resiliency of residual trees, particularly the remaining large pines, from drought, insects, and disease.
- Produce a sustainable supply of timber and other forest commodities to support local and regional timber-related businesses.
- Reduce the fuels hazards associated with high fuel loading and overstocking that makes these stands vulnerable to stand replacing wildfires.
- Improve riparian conditions including restoration of aspen clones.
- Maintain/improve condition of the transportation system.
- Replace portions of the decadent true fir stands with ponderosa pine, Douglas-fir and white pine.

Need

There is a need to implement the management direction for the Land Use Allocations being analyzed in this EA including Matrix and Riparian Reserves (RMP page 2-6). The Matrix lands have RMP objectives to produce a sustainable supply of timber and other forest commodities as stated in the KFRA RMP and O&C Act of 1937. Matrix lands also need to provide habitat for a wide array of wildlife species and meet clean air and water requirements. Management objectives for the riparian reserve lands include meeting all nine of the Aquatic Conservation Strategies (RMP page D-6). Specific resource needs are discussed below by land use allocation.

Matrix Lands

The proposed 15 acres of regeneration harvest is needed to remove and replace existing decadent stands of true firs with ponderosa pine and younger more resilient firs. Field observations and timber stand data show that the existing timber stands in the proposed project area are presently overstocked, experiencing declining forest health (stand resiliency) and reduced annual growth. The presence of large (24 to 60 + inches dbh) ponderosa pine and white pine snags (some currently dying and some dying within the last few years) suggests that current stand dynamics are contributing to the decline of these desirable mature trees. Regeneration harvest (excluding ponderosa pine) is needed in these stands to provide open growing conditions to reestablish a more historically representative tree species composition including ponderosa pine trees. Currently, true fir trees are replacing and crowding out the larger and less shade tolerant pines. Pine regeneration will not succeed under closed canopy conditions currently present. (Note: Forest health in this EA is defined as the resiliency of the forest ecosystems to sustain themselves in the process of natural disturbances such as insect outbreaks and wildfires. A more detailed discussion of forest health can be found in the KFRA 1994 FEIS, pages 3-63 to 3-66.) Approximately 400 thousand board feet (MBF) of timber would be harvested from matrix lands under the proposed action.

Riparian Reserves

Trees within densely stocked stands are subject to stress and vulnerable to attack by insects and diseases. There is a need to reduce stocking levels to improve growing conditions (reduced competition for water, nutrients and light) and increase the vigor of the remaining trees on approximately nine acres of dense, overstocked forested stands in riparian reserve areas of the proposed project area. In addition, to protect and improve growing conditions for many of the remaining large pines as described above, encroaching true firs need to be removed from the immediate vicinity (dripline plus 20 feet) of those large (24 to 60 + inches dbh) pines.

There is a need to restore approximately five acres of declining aspen clones within the riparian reserves in the proposed project area. The aspen clones are declining due to conifer encroachment and livestock grazing. Aspen decline is indicated by the presence of dead and down aspen logs in areas now occupied by conifers and the general lack of younger age classes of aspen in areas where a few living mature aspens persist. Aspen sprouts are present in most of these areas but are annually targeted by livestock, deer and elk before they can grow to larger sizes. All of the conifers in the aspen clone areas, except for a few larger ponderosa pines and true firs, need to be removed to allow the aspen clones to regenerate. Functioning fences need to be constructed/relocated and maintained to prevent overuse by livestock. An existing fence, not located on the BLM property line, needs to be relocated to the property line between BLM and private lands. Finally, residual slash in the aspen restoration areas needs to be removed either by scarification and/or prescribed fire to stimulate aspen sprouting. Approximately 100 MBF of timber would be removed from the riparian reserves under the proposed action.

Fuels

There is a need to reduce fuel loading on approximately 25 acres (matrix and riparian reserves) of the proposed project area. Pre-cruise plots and site visits have indicated that residual fuels, particularly dead and down fuels are excessive in some of these areas. Any occurrence of uncontrolled fire would likely result in unacceptable levels of conifer mortality including most or all of the remaining mature pines. Excessive down wood needs to be removed from the stand (yarded to landings) where it could be removed if feasible or piled and then burned. Some areas of fuel concentrations could be piled in the timbered areas by machine or hand and then burned.

Desired Future Condition and RMP Objectives

Matrix Forest Stands

The RMP explains in detail the desired future condition and objectives of forested stands in the Matrix (See page 22 and pages E-8 to E-11). In general, the desired future condition of the Matrix forest landscape is a healthy, diverse, and productive forest that is resilient to natural disturbances (disease, drought, insects, and fire) and meets the following objectives:

- Produces a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability (RMP page 22).
- Provides connectivity (along with other allocations such as Riparian Reserves) across the landscape for forest dependent plant and animal species (RMP page 22).
- Provides habitat for a variety of organisms associated with both late-successional and younger forests (RMP page 22).
- Provides for important ecological functions such as dispersal of organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags, and large trees (RMP page 22).

The RMP discusses target stand conditions that over time would trend towards a forest composed of stands containing a variety of structure, trees of varying sizes and ages, and stands with an assortment of canopy configurations (RMP page E-9). Desired Species Composition (by percent conifer basal area), shown on Table E-1 of the RMP, is designed to improve stand resiliency. The Buck 13 Timber Sale silvicultural prescription was developed to meet these desired future conditions (see Appendix C).

Riparian Reserves

In general, the desired future condition of riparian reserves is proper functioning condition of riparian areas (streams, wetlands, etc.) and healthy upland vegetation which contributes to meeting the following objectives:

- the Aquatic Conservation Strategies listed on page D-6 of the RMP
- reduced risk of high intensity fires as well as insect infestations and tree diseases
- reduced sediment input to streams from natural disturbances and management actions
- restoration and maintenance of healthy riparian vegetation, including aspen clones

Roads

The RMP (pages D-13 to D-21) lists the desired future conditions and objectives for managing roads in the KFRA. The desired future condition for roads in the analysis area is a transportation system that meets the following objectives:

- provides suitable transportation facilities for management and recreational use
- ensures that the road investment is maintained and that roads and road use are not contributing to resource damage
- reduces road densities where feasible
- preserves existing legal access and right-of-ways to private lands

Environmental Analysis and Decision Process

An interdisciplinary evaluation of the resources in the analysis area including wildlife, recreation, soils, fisheries, timber, cultural, hydrology, and others will be documented as part of this EA. The analysis is accomplished by examining the different resources in the analysis area and recommending a course of action that best meets the objectives outlined in the Klamath Falls Resource Area (KFRA) Resource Management Plan (RMP).

This analysis is tiered to the Final - Klamath Falls Resource Area Resource Management Plan and Environmental Impact Statement, September 1994 (KFRA RMP EIS). The purpose of this EA is to assess the effects of the proposed treatments and to determine if the environmental effects associated with the proposed site-specific treatments are significant and/or greater than those already analyzed in the previous KFRA RMP EIS. If the effects are not significant or greater than analyzed in the KFRA RMP EIS, a Finding of No Significant Impact (FONSI) will be documented upon the completion of the analysis. In addition to providing analysis and disclosing the environmental consequences to determine whether or not an environmental impact statement is necessary, this EA will provide the public with information about the proposed treatments, describe the alternatives and the associated effects with each alternative, and inform the decision maker of potential consequences resulting from selecting one of the alternatives.

The KFRA Field Manager, as the responsible official, will decide whether or not to implement the Proposed Action and determine whether or not the proposed action is consistent with the RMP as well as other laws and regulations (i.e., the Endangered Species Act and Clean Water Act, etc.). The proposed treatments or projects would span a 3-7 year period. Information obtained from biological surveys and Threatened and Endangered Species consultation with the US Fish and Wildlife Service is included in the EA and will also be incorporated in the final Decision Record for this EA.

Public Input Summary and Issue Development

A scoping letter dated July 12, 2007 was sent to the resource area timber sale EA mailing list of approximately 130 people. The letter outlined the Buck 13 Timber Sale project proposal and asked the general public for comments. The resource area received one comment letter from two

organizations. The issues and concerns raised in the comment letter and through internal analysis were considered in formulation of the alternatives (Chapter 2) and for determination of needed analysis (Chapter 3). The issues and responses to those issues are briefly summarized below:

Roads

Issue: *Construct no new roads including temporary roads.*

Response: No new roads or new temporary roads are proposed under the Buck 13 Timber Sale EA (see Proposed Action pages 1 and 13).

Issue: *Reduce road densities.*

Response: The 38-5E-12 Road is the only road that would be used under the proposed timber sale. This road currently accesses private property and the private property owners have a Perpetual Right-of-Way Grant (No. OR59243FD) for use of the 38-5E-12.0 road. No opportunity exists to reduce road densities on BLM lands in the proposed timber sale area.

Soils

Issue: *Avoid soil impacts associated with logging and roads. Avoid and minimize soil disturbance.*

Response: In accordance with BLM policy, Project Design Features (PDFs) and Best Management Practices (BMPs) would be implemented to reduce any negative effects of the proposed logging activities (see Appendix B). The BMPs and PDFs include minimum spacing between skid trails, orientation of skid trails, designated crossings through riparian reserves, landing size limitations and avoiding landings in riparian reserves where feasible. In addition, harvesting is generally implemented during the summer and fall (June-October) when soils are drier and less susceptible to disturbance and compaction. Further reduction of soil impacts would be expected if logging is conducted over snow as described in the BMPs and PDFs. Snow logging is encouraged on KFRA timber sales where winter accumulations are sufficient. The Buck 13 Timber sale area is likely to have adequate snow most years to allow winter logging. Specific soil types are described in Chapter 3-Affected Environment and Environmental Consequences (pages 36 - 40). Again, no new roads or temporary roads are proposed in the Buck 13 EA. In addition, the Buck 13 EA is tiered to the KFRA ROD/RMP which addresses and analyzes in detail, road use and specifications and associated impacts (pages 71-73 and Appendix D, D13-D21). The EA also addresses road-related environmental effects (page 41). Page 46 (Table 24.1) of the 2005 Klamath Falls Resource Area Annual Program and Monitoring Report summarizes the road and transportation management progress in the KFRA since 1995 when the RMP was signed. There has been a net decrease in permanent existing roads and open roads in the KFRA since 1995 resulting in beneficial effects to soils, wildlife and hydrological resources.

Vegetation

Issue: *Avoid cutting large trees and old-growth.*

Response: The KFRA ROD/RMP (page E-3) specifies that "...trees in all size classes are eligible for thinning in order to reduce stocking to site capacity." The KFRA monitors stand structure and forest conditions on an annual basis (see 2004 Annual Program Summary and Monitoring Report (APS) pages 88-92 and 2006 APS pages 84 to 89). In the Density Management areas of the proposed timber sale, a primary goal is to retain the larger healthier trees. To promote resiliency of declining larger pines in the density management area, white fir trees of all diameters growing near the pines need to be thinned or removed. In the Regeneration portion of the proposed timber sale most of the larger defective white fir trees need to be removed in order to maintain the health of declining mature (20 to 60+ inch dbh) ponderosa pines and to promote regeneration of the shade intolerant pines. None of the existing ponderosa or white pines would be removed.

Issue: *Implement diameter limits and retain all trees over 12 inches DBH.*

Response: As stated above, the KFRA ROD/RMP (page E-3) specifies that "...trees in all size classes are eligible for thinning in order to reduce stocking to site capacity." In all portions of the proposed timber sale area trees larger than 12 inches dbh need to be removed for several reasons including: reduction of competition/stocking, re-establishment of historical species composition, removal of insect and disease infestations, aspen restoration and production of a stable timber supply to local manufacturing centers. In addition, a 12 inch diameter limit would result in very few trees being removed from the analysis area with a corresponding lack of thinning benefit to reduce overstocked conditions and the declining health of the mature pines and aspen clones.

Issue: *Retain and protect under-represented conifer species and non-conifer trees and shrubs.*

Response: One of the main goals of the proposed timber sale is to protect and restore underrepresented or declining species including ponderosa pine and aspen (see Proposed Action page 1 and Purpose and Need pages 4 and 5). Currently, due to closed canopy conditions, there are almost no shrubs present on the entire area of the proposed timber sale. Opening of the dense stands of timber through timber harvesting would allow light to reach the forest floor and may stimulate some shrub production. Repairing and maintaining existing fences and resting the area from grazing for at least three years would also help aspen sprouts and shrubs become established.

Issue: *Thinning should be done at variable densities and carefully, thin from below.*

Response: Where thinning/density management is proposed, in portions of the riparian reserve areas, the primary goal is to promote the health of the surviving mature pines and the reserved timber stand. Post treatment stocking levels would be variable with heavier thinning planned immediately adjacent to the pines. Thinning would include removal of trees of all diameter classes but the primary emphasis would be to retain and protect the larger trees. Thinning would be concentrated in the smaller diameters (see Figure 4).

Issue: *Avoid spread of noxious weeds.*

Response: No current populations of noxious weeds have been located in the analysis area during botanical surveys. Noxious weeds are addressed on page 20 of this EA. The BMPs and PDFs include measures that would be implemented to prevent their introduction or spread (see Appendix B page 57).

Issue: *Retain smaller diameter trees with old-growth characteristics.*

Response: As noted above, trees of all diameter classes would be harvested and thinned under the proposed action. Smaller diameter trees with old-growth characteristics are not common in the existing closed canopy timber stand. However, almost all of the existing ponderosa pines would be reserved and these trees do include some suppressed smaller diameter pines with "old-growth" characteristics.

NEPA

Issue: *Ensure meaningful public participation.*

Response: Public scoping of the proposed project was accomplished via a letter mailed to the KFRA's EA mailing list (see EA pages 6 and 7). This list of issues and responses is part the public participation that was gained from the scoping efforts. In addition, when this EA is completed it will be made available for further public comment during a 30 day public comment period.

Issue: *Ensure rational and informed decision making, and adequate funding.*

Response: Decisions regarding the proposed project are made by the KFRA Manager. The Manager relies upon a thorough review of the proposed projects purpose and need, desired future conditions, public input and issue identification, and Interdisciplinary Team review and recommendations. Implementation funding for the projects described in the proposed action is anticipated to be available.

Issue: *Include an alternative to enhance wildlife habitat and vegetation without using commercial timber harvest.*

Response: Two alternatives that excluded commercial timber harvesting were considered but were not analyzed in detail because they would not meet the purpose and need for vegetation treatments. One alternative was a “restoration only” treatment and the other alternative was a “prescribed fire only” treatment (see EA pages 14 and 15).

Issue: *Ensure consideration of a full range of alternatives.*

Response: Two alternatives, a “proposed action” alternative and a “no action” alternative were fully considered. Four additional alternatives were considered but not analyzed in detail. Those alternatives included: salvage only, restoration treatments only, prescribed fire only, and thinning with no harvest of large trees (see EA pages 11 - 15).

Issue: *Disclose cumulative impacts of ground disturbance, road use, and impacts to wildlife habitat in this EA.*

Response: Cumulative impacts are disclosed in the Environmental Impacts sections of this EA. Impacts to soils (ground disturbance) are discussed on pages 39 - 40. Impacts associated with road use are discussed on page 41. Impacts to wildlife are discussed on pages 31 - 36.

Wildlife

Issue: *Ensure adequate surveys are completed prior to developing alternatives.*

Response: Surveys were conducted for wildlife (EA pages 30-31) and vegetative species (EA pages 19-20) as required by BLM regulation and policy.

Issue: *The project area appears to be in Critical NSO habitat. Any action in Critical Habitat must benefit recovery of the owls.*

Response: The proposed project area is not in currently designated critical habitat for the Northern Spotted Owl as designated by the U.S Fish and Wildlife Service (FWS) in 1992 (USDI 1992). A proposed rule (USDI 2007) was issued by the FWS in June, 2007 to modify the boundaries of designated critical habitat. If the proposed rule is accepted, the project area would still be outside of designated critical habitat.

Issue: *Impacts to old-growth species must be considered including impacts to goshawks, bats, Canada lynx, woodpeckers, pine marten, California wolverine, great gray owls, pygmy nuthatch and bald eagles.*

Response: Impacts to the above mentioned species are discussed in the “Terrestrial Wildlife Species – Environmental Consequences” section of this EA (see pages 31 - 36).

Issue: *All snags and large down wood in the project must be retained for snag and CWD dependant species.*

Response: At least 2.4 snags per acre would be retained with a minimum diameter at breast height (DBH) of 16”, or largest available if less than 16” (RMP/ROD, pages 26-27). No snags would be designated for commercial harvest (see Figure 5). Only snags that present an operational safety

hazard would be designated for cutting. An average of at least one hundred and twenty (120) linear feet of down logs per acre would be retained. Logs would be greater than or equal to sixteen (16) inches in diameter and sixteen (16) feet long (RMP/ROD, page 22). Information regarding snag and CWD retention can be found in the EA on pages 11 and Appendix B.

Issue: *Avoid impacts to raptor nests and to raptor prey species.*

Response: No raptor nest sites have been located in the analysis area during wildlife surveys. Any raptor nests located during project activities would be avoided and protected as described in the KFRA RMP on page 38. Habitat for raptor prey species would be maintained through implementation of snag and CWD requirements as described above (see Appendix B).

Water Quality

Issue: *Assess impacts of actions on water quality and the Aquatic Conservation Strategies objectives.*

Response: The proposed activities are consistent with the objectives for riparian reserves and the Aquatic Conservation Strategy (ACS) in the KFRA RMP and would not prevent or retard attainment of any of the ACS objectives (RMP, pages 7-8). Further information is available in this EA in the Hydrology – Environmental Consequences section (pages 42-45) and the Aquatic Wildlife Species – Environmental Consequences section (pages 46 – 47).

Fire and Fuels

Issue: *Prioritize treatment areas with community zones receiving the highest priority.*

Response: The proposed project area is immediately adjacent to (less than ¼ mile) private lands that include structures.

Issue: *Analyze proposed treatments to determine effectiveness and whether or not proposed treatments including harvesting could actually increase wildfire severity and risks.*

Response: One of the primary goals of the proposed project is to treat fuels to reduce the risk of stand replacing wildfire. With this goal in mind, actions required under the proposed timber sale include: whole tree yarding, lop and scatter of residual debris, piling and burning of residual debris concentrations, and potentially underburning (see proposed action page 1 and Vegetation – Environmental Consequences pages 20 - 25). All of these activities would remove fuels from the analysis area and decrease fire risks. These treatments would have to be balanced with CWD and snag retention requirements to ensure retention of adequate down wood and snags for wildlife and nutrient retention.

Issue: *Avoid large burn piles that could have adverse impacts to soil and water.*

Response: The proposed project would encourage the removal of most of the woody debris/slash from the landings rather than burning it. This would be accomplished by chipping the cull material/slash or hauling cull logs off site. If burning of landing piles is required, impacts would be limited to two or three landing areas. Burning of some residual debris at the landings and burning of smaller piles within the timber stand would be conducted even if the cull material/slash was removed from the site.

Issue: *Avoid unintended fire damages to large trees, CWD and snags.*

Response: Underburning is proposed in the aspen restoration area and would be used to reduce fuel loads while stimulating aspen sprouting. Underburning could also be conducted in the remaining portions of the analysis area if needed. In both cases, large leave trees, particularly mature pines would be protected through one of several methods including: duff pull-back, snow collar burning,

using very low intensity fire or avoidance of large trees by not lighting near them or excluding them from the proposed burn area with hand fire lines or other barriers. Snags would also be similarly avoided in burning operations. Snags and CWD would be retained in accordance with the PDFs and BMPs in Appendix B.

Management Direction and Conformance with Existing Plans

This Environmental Assessment (EA) is tiered to the Klamath Falls Resource Area Resource Management Plan and Final Environmental Impact Statement (RMP/FEIS, September 1994) and Record of Decision (ROD, June 2, 1995). Management direction and recommendations for project design and implementation is contained in the RMP and a number of supporting documents listed below:

- Klamath Falls Resource Area Integrated Weed Control Plan EA (July 21, 1993).
- Range Reform FEIS (August 1995).
- Final Environmental Impact Statement, Vegetation Treatment on BLM Lands in Thirteen Western States (1991).
- Aquatic Conservation Strategy Supplemental Environmental Impact Statement/Record of Decision 2004 (ACS SEIS EIS/ROD – 2004)
- Final Supplemental Environmental Impact Statement To Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines (2007).

CHAPTER 2 - PROPOSED ACTION AND ALTERNATIVES

There are two alternatives analyzed in this environmental assessment. Below is a description of each alternative. Four additional alternatives were considered but dropped from further analysis as noted below on pages 14 and 15.

Proposed Action

The Proposed Action is designed to meet the purpose and need described in this EA by improving the health of forested stands, maintaining mature pines, restoring historical pine and aspen stands and reducing hazardous fuels conditions. The silvicultural prescription for the Buck 13 Timber Sale can be found in Appendix C of this EA. Table 1 shows the specific design of the Proposed Action. A description of these actions follows:

Westside Matrix Forest Lands

Regeneration harvest would occur on approximately 15 acres of the westside matrix LUA. This type of harvest would be implemented to remove decadent true firs to create growing space for more desirable ponderosa pines and healthier true firs (RMP/ROD, page 56). Figure 4 (EA page 22) shows the approximate diameter distribution of trees scheduled for harvesting and retention under a regeneration harvest. Approximately 16-25 large green trees per acre would be retained in the regeneration harvest area (RMP/ROD, page 23). The trees retained would include all of the ponderosa pines and western white pines and the healthiest true firs. Some of the larger, decadent true firs would also be retained to provide wildlife habitat and meet the 16 to 25 large green tree requirement. At least 2.4 snags per acre would be retained with a minimum diameter at breast height (DBH) of 16", or largest available if less than 16" (RMP/ROD, pages 26-27). Only snags that present an operational safety hazard would be designated for cutting. No snags would be designated for commercial harvest (see figure 5). An average of at least one hundred and twenty (120) linear feet of down logs per acre would be retained. Logs would be greater than or equal to sixteen (16) inches in diameter and sixteen (16) feet long (RMP/ROD, page 22). Cutting would be done by hand

and/or mechanically. Merchantable trees designated for harvest would be yarded downhill to designated landings along the main access road. No new road construction would be required.

Riparian Reserve

Approximately nine acres of density management (thinning) would occur in riparian reserves. Density management includes thinning of all diameters to create and maintain unevenaged stand characteristics. Ponderosa pine, western white pine, and Douglas-fir would be favored as leave trees. Figure 3 (EA page 22) shows the estimated tree harvest and retention by diameter classes under KFRA's density management guidelines. Cutting would be done by hand and/or mechanically. In addition to density management, true firs would be thinned from areas immediately adjacent (dripline plus 20 feet) to large (20 inches dbh and larger) ponderosa and white pines (see Appendix C). The objective is to reduce the stand density in the Riparian Reserve and improve the resiliency of the remaining trees, particularly the larger mature pines. Harvested trees would be whole tree yarded. Residual debris would be lopped and scattered. In areas of heavy slash accumulations, excess slash would be machine or hand piled for later burning. Snags and CWD would be retained as described for matrix lands above. Only snags presenting an operational safety hazard would be designated for cutting.

Merchantable trees would be yarded downhill to designated landings along the access road. The entire access road is within designated riparian reserves. Two to four landings would be required along the access road, within the riparian reserves. No new road construction would be required.

Aspen Restoration (within riparian reserve, see Figure 2)

Approximately 5 acres of riparian reserve that includes remnant aspen clones would have all of the conifers removed except those larger than 24 inches dbh and existing ponderosa pine trees. The merchantable trees (generally 8 to 24 inches dbh) would be yarded with a cable to the access road or left in place to meet snag and CWD requirements. The unmerchantable material would be lopped and scattered and later piled and burned or broadcast burned, depending upon the amount of slash, to promote aspen regeneration. The majority of the aspen treatment area (approximately five acres) is separated from the rest of the stand by the main access road (Road 38-5E-12.0).

Volume Harvested

In the Matrix Land Use Allocation (LUA), approximately 400 thousand board feet (MBF) of timber would be harvested. In the Riparian Reserve LUA, approximately 100 MBF of timber would be harvested. Appendix B of this EA includes the project design features, and best management practices for treatment of forested areas. Appendix C of this EA includes the silvicultural prescription for the proposed project.

Fuels Treatment

Upon completion of harvesting, up to 24 acres would be jackpot burned and/or piled and burned as needed to reduce fuel hazards. Jackpot burning is a type of prescribed burning that targets concentrations of fuel, such as duff collars around large trees. Jackpot burning would occur under moist conditions that ensure very-low fire intensities and prevent spread through the unit. This treatment would occur in both the Matrix and Riparian Reserve allocations. Fuels in the aspen restoration area would be treated as described in the Aspen Restoration section above.

Grazing/Fencing

Grazing inside the livestock fence that borders BLM ownership in Section 13 would be restricted for at least three years following harvest activities to allow aspen sprouts to grow large enough to

survive grazing impacts. The livestock fence that exists parallel to the main access road would be relocated to the property line to the west of the road. This action would move the fence westward varying distances from approximately ten to 100 feet and would help keep livestock out of the aspen restoration area.

Roads and Transportation System

Approximately 0.25 miles of the 38-5E-12.0 Road would receive spot surface rock to repair low points or areas with poor drainage (road improvement). Approximately 1.2 miles of the 38-5E-12.0 Road would be graded and the ditches would be cleaned (road renovation). The 38-5E-12.0 Road would remain closed to public access after the timber sale. Public access to the BLM lands in Section 13 would continue to be limited to foot traffic through adjacent public lands. Private access would continue as described in the Nancy Charley Family Trust Right-of-Way. No new roads would be constructed.

Table 1: Detailed Description of the Proposed Action

UNIT 13-1 (approximately 29 total acres)	
Westside Matrix Forest Lands (approximately 15 total acres)	
Silvicultural Prescription Regeneration Harvest	Approximately 15 acres
Fuel Reduction Whole Tree Yarding	Approximately 15 acres
Yarding Excessive Concentrations of Down Wood	Approximately 15 acres
Lop and Scatter	Approximately 15 acres
Slash Piling, Machine and Hand	Approximately 15 acres
Pile and/or Jackpot Burning	Approximately 5 acres
Riparian Reserves (approximately 9 total acres)	
Silvicultural Prescription Density Management (thinning)	Approximately 9 acres
Culturing Around Large Pines	Approximately 9 acres
Fuel Reduction Whole Tree Yarding	Approximately 9 acres
Yarding Excessive Concentrations of Down Wood	Approximately 9 acres
Lop and Scatter	Approximately 9 acres
Slash Piling, Machine and Hand	Approximately 9 acres
Pile and/or Jackpot Burning	Approximately 9 acres
Riparian Reserves Aspen Restoration (approximately 5 total acres)	
Conifer Removal (all conifers smaller than 24" dbh)	Approximately 5 acres
Slashing (all conifers smaller than 8 " dbh)	Approximately 5 acres
Prescribed Fire (to promote aspen regeneration)	Approximately 5 acres
Road Treatments and Transportation Management	
Road improvement (spot rocking)	Approximately .25 miles
Renovation (grading & brushing – road maintenance)	Approximately 1.2 miles
Road closures (Blocking)	None
Volume	
Matrix Regeneration Harvest	Approximately 400MBF
Riparian Reserve Density Management	Approximately 80MBF
Riparian Reserve Aspen Restoration (conifer removal)	Approximately 20MBF
Total	Approximately 500MBF

Activities listed in Table 1 would adhere to Best Management Practices (BMPs) described in Appendix D of the RMP and additional Project Design Features (PDFs) and BMPs listed in Appendix B of this EA. Both the BMPs and PDFs are designed to minimize adverse effects on the natural and human environment, including: vegetation, soils, roads, wildlife, hydrology, cultural, visual, and recreation resources.

No Action Alternative

BLM policy encourages analysis of a No Action Alternative. This alternative proposes no new management activities in the project area. Activities proposed in and adjacent to the analysis area and analyzed in other NEPA documents would still occur such as fuel reduction treatments, routine road maintenance, seasonal road closures, forest inventory and surveys, and fire suppression. The selection of the No Action alternative would not change land allocations or the direction that the BLM has to manage these lands as Matrix.

Other Alternatives Considered But Eliminated From Detailed Analysis

Issues identified through public scoping process and through other internal discussions resulted in consideration by the KFRA Interdisciplinary Team (IDT) of several potential alternatives that were considered but later dropped from detailed analysis for a variety of reasons. Four such alternatives are outlined below. Rational for dropping the alternatives from consideration is included.

Salvage Only Alternative

An alternative was considered that would have analyzed impacts related to salvage harvest only in the proposed project area. This would involve the harvesting and removal of only scattered dead and dying trees throughout the Buck 13 timber sale area. Salvage is discussed in the RMP (pages 55 and E-4). Annual mortality and blowdown in the Klamath Falls Resource Area has occurred since initiation of the RMP in June of 1995. Moderate amounts of mortality are anticipated to continue, especially in white fir from *Scolytus ventralis* (fir engraver beetle) and from poor growing conditions associated with the overstocked timber stands in section 13. The “salvage only” alternative was dropped from further consideration because it would not address the need to thin stands to promote forest health, change conifer species composition and restore aspen clones. Salvage only would also result in limited contributions to local timber supplies. Potential salvage volume in the Buck 13 analysis area was estimated during timber cruising activities to be less than 15 MBF, much less than the approximately 500 MBF that would be harvested under the proposed action.

Restoration Treatments Only Alternative

Another alternative considered was one that would analyze effects of implementing only the restoration treatments from the Proposed Action, primarily hazardous fuel reduction treatments (slash piling and/or underburning) and aspen restoration in the Matrix and Riparian Reserves with no commercial timber harvest. This alternative was dropped from further analysis based on the understanding that environmental effects of implementing restoration treatments will be sufficiently discussed in the Proposed Action. Additionally, the determination was made that a “Restoration Treatments Only” alternative would not fully meet the land use plan objectives or the purpose and needs for the proposed action. In particular, the restoration only alternative would not meet the need to produce a sustainable supply of timber and other forest commodities to support local and regional timber-related businesses. Finally, to restore resiliency to the large pine component, at least some of the competing true firs would need to be removed. To remove them without harvesting the wood would still require yarding the material or killing them in place. Killing the competing true firs in

place or falling them and leaving them in place would add unacceptable amounts of fuels to already high fuel loads.

Prescribed Fire Only Alternative

A prescribed fire only treatment was considered to thin the overstocked stands and restore aspen clones. This treatment was dropped from consideration for several reasons. First, due to the existing heavy fuel loads (both dead and down material and standing green trees) in the matrix and upper portion of the riparian reserve, controlled underburning that would meet the purpose and need of this EA would be difficult or impossible to implement. It would be extremely difficult to burn under conditions required to achieve sufficient consumption of fuels and yet keep the fire intensity/duration low enough to not damage or kill the residual trees. Excessive mortality of conifers, including most of the remaining large pines would be expected. Second, the need to produce a sustainable supply of timber and other forest commodities to support local and regional timber-related businesses would not be realized. Finally, in the aspen restoration areas, the existing ground fuel loads are much lower than the rest of the analysis area and the resulting prescribed fire may not be hot enough to reduce the conifer overstory and stimulate sprouting of the aspen clones.

Thinning Only and No Harvest of Large Trees Alternative

Another alternative considered thinning of trees 12 inches dbh and smaller with no harvest of larger diameter trees. This alternative was rejected for several reasons. First, under this alternative, very little thinning benefit would be realized for most of the declining mature pines. Most of the trees existing within the target thinning radius of the larger pines are greater than 12 inches dbh. Second, in the aspen restoration area, thinning of trees 12 inches dbh and smaller would not provide adequate growing space for residual aspens or stimulation of aspen sprouting. Finally, the need to produce a sustainable supply of timber and other forest commodities to support local and regional timber-related businesses would not be realized as only small amounts (estimated less than 20 MBF) of timber volume would be harvested. Other higher harvest diameter limits were considered but were rejected for generally the same reasons listed above. A harvest diameter limit of 24 inches dbh was proposed for the five acres of aspen restoration because existing tree diameters in the aspen area are generally smaller and enough trees would be removed with a 24 inch diameter limit to stimulate aspen growth and regeneration.

CHAPTER 3 – AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Introduction

This chapter summarizes the physical, biological, and socioeconomic environment of the Buck 13 Timber Sale area and the consequences of the proposed actions. A detailed discussion on the affected environment and environmental consequences can also be found in the Klamath Falls Resource Area RMP/ROD and FEIS (pages 3-3 to 3-79). The affected environment reflects the existing condition that has developed from all past natural events and management actions within the project area (and/or 5th field watershed). It is a combination of natural and human caused fires, fire suppression, road building, timber harvesting, grazing, fuel reduction treatments, and the effects of recreational use. The current condition assessed for each affected resource is a result of all past natural events and management actions. It is therefore unnecessary to individually catalog all past actions in this EA. Such detail would be irrelevant to making a rational decision among alternatives. The important value of this EA is to assess and display for the deciding official the impacts of the alternatives on those resources as they exist today, to allow a determination as to whether or not the resulting project effects and/or cumulative effects are either significant or greater than those analyzed in the RMP EIS.

Resource values that are either not present in the project area, or would not be affected by any of the proposed alternatives are: wilderness study areas (WSAs), areas of critical environmental concern (ACECs), research natural areas (RNAs), paleontological resources, prime or unique farmlands, wild and scenic rivers, air quality, and minerals. There are no known hazardous waste sites in the analysis area. For either alternative, no direct or indirect disproportionately high or adverse human health or environmental effects to minority or low income populations are expected to result from implementation of the proposed action or the alternatives.

Project/Analysis Area(s)

The purpose of this section is to clarify the Project Analysis Area and the different landscape scales that were used for analysis. The Project Area is the actual boundary of the treatment area. For a timber sale, it is the harvest unit boundary as shown on the Proposed Project Map (Figure 2). In describing the affected environment and environmental consequences, analysis was generally discussed at two different landscape scales. One scale, most frequently referred to as the analysis area, is the environment within or adjacent to the immediate vicinity of the Project Area. The other scale that is often used is the 5th field watershed scale (Fifth Field Watershed Map, Figure 3). This includes all lands, private and agency lands, that fall within a 5th field watershed. When describing cumulative impacts to hydrology, vegetation, and wildlife, the 5th field watershed scale is usually used.

Design of This Chapter

This chapter is designed to first describe the affected environment of a particular resource in its currently existing condition, followed by a discussion of potential environmental effects on that resource by alternative. The No Action Alternative is discussed first and includes a discussion of cumulative impacts anticipated regardless of implementing the Buck 13 Timber Sale. A number of other treatments are proposed under different environmental documents in the Spencer Creek 5th field watershed and are analyzed as part of the impacts of the proposed Buck 13 Timber Sale.

Cumulative Actions Considered

Timber management in the last decade on BLM lands in the Spencer Creek Fifth Field Watershed has included two sales and one District Designated Reserve (DDR) thinning. Approximately 1,450 acres of Density Management/thinning was accomplished. Within this same watershed, approximately 1,550 acres of timber management activities are proposed over the next ten years. Timber management activities proposed in the Klamath Falls Resource Area consist generally of Density Management (thinning) prescriptions and are designed to promote uneven-aged management. Regeneration harvests are occasionally implemented where all except 16 to 25 of the largest trees per acre are removed (see Tables 2 and 3). In Density Management prescriptions, trees of all diameter classes are selectively harvested with emphasis placed on retaining forest stands with representatives of all diameter classes. Approximately 25% to 40% of the stand is harvested with the majority of the harvested trees being from the smaller diameter classes. Stands throughout the Matrix allocation are expected to be selectively harvested approximately every 20-30 years, according to Klamath Falls Resource Area management plans. Current timber management on the surrounding private land is more intensive and occurs on a larger scale. This management regime is expected to continue in the future. On most private lands, it is anticipated that residual vegetation will be reflective of early seral conditions and will meet pertinent state laws governing forest management practices. Regeneration harvests retain 16 to 25 large green trees per acre and are usually replanted with desirable tree species soon after harvest.

Table 2: Projects completed during last ten years (including 1998 to present) on BLM lands within the Spencer Creek 5th Field Watershed

Treatment	Approximate Volume (MBF)	Approximate Regeneration Harvest Acres	Approximate Density Mgmt Acres	Approximate Total Acres	Year(s) implemented
Timber Sales/Vegetation Treatments					
Tunnel Creek DDR Thinning	.30	0	108	108	2007, 2008
Kakapoo Stew Timber Sale	2.17	0	397	397	1997-2000
STH Salvage Timber Sale	.09	0	50	50	1998-2000
Clover Hookup Timber Sale	2.96	39	905	944	2000-2002
Sinking Salvage Timber Sale	.04	0	30	30	2002-2005
Surveyor Mnt. Timber Sale	9.15	126	220	346	2004-2007
TOTALS	14.71	165	1,710	1,875	
Prescribed Fire					
Kakapoo Underburn				157	2001
Spencer Creek Piles				45	2004
Surveyor TS Piles				195	2007
Mechanical Fuels Treatments					
Spencer Creek				45	2003
Tunnel Creek				85	2007

Table 3: Additional Actions Proposed on BLM lands within the Spencer Creek 5th Field Watershed

Treatment	Approximate Vol MBF	Approximate Regeneration Harvest Acres	Approximate Density Mgmt Acres	Approximate Total Acres	Anticipated Year
Timber Sales*					
Buck 15	2.92	17	450	467	2008, 2009
Portion of Buck 23 **	2.87	0	765	765	2008-2010
West Spencer	2.00	0	800	800	2010-2012
Mid Spencer	3.00	0	650	650	2011-2013
Portion of Kent Oval**	.16	0	25	25	2012-2014
Portion of Cherry Glade**	.28	0	55	55	2012+
Portion of North Frosty**	.03	0	30	30	2012+
TOTALS	11.26	17	2,775	2,792	
Land Exchanges /Sales					
Charley Trust Land Sale	.04	0	3	3	2008
Prescribed Fire					
Tunnel Creek DDR*				123	2008, 2009
Clover Butte*				500	2012
Clover Creek*				200	2012
Lower Spencer Ck DDR				200	2012
Mechanical Fuels Treatments					
Upper Spencer Ck DDR*				300	2012
Miners Creek DDR*				300	2013

* All of the projects listed in Table 3, except Buck 15 are proposed. Acres, volumes and dates may vary. Buck 15 was sold in 2008 and is anticipated to be treated in 2008 and 2009.

**Sales and other actions described in Table 3 as “Portion of.....” are parts of proposed timber actions that are located in part in adjacent Watersheds. Portions of these sales are located in the Spencer Creek Fifth Field Watershed. In Table 3, acreages and volumes are estimated to reflect the area and resources impacted in the Spencer Creek Fifth Field Watershed.

Vegetation - Affected Environment

Upland Forest

Forests occurring in the proposed 29 acre treatment area can be generally described as multi-aged, multiple canopy forested stands of primarily white fir with remnant groups of large (24 to 60 + inches dbh) ponderosa pine, white pine, and sugar pine. Some of the riparian areas have remnant stands of aspen and/or evidence of past aspen occupation (aspen logs and snags). Portions of the same riparian reserve, adjacent to private pasture lands, are dominated by sapling to small sawlog sized lodgepole pine. Portions of the aspen restoration stand have been selectively cut in the past leaving an array of trees sizes and ages. The approximately 15 acres of matrix lands are occupied by mostly white fir with some areas dominated by large defective white fir trees and groups of large declining pines. Many of the clumps of large mature pines are dead or in declining health due to overcrowded growing conditions and encroachment by true firs. Tree sizes range from saplings to large trees over 60" dbh. Tree ages range from one to over 500 years old with the majority of the stand being between 100 and 200 years old. Little or no commercial harvest has occurred in most of the matrix lands and portions of the riparian reserves (approximately 20 acres).

Present in the forested stands of the proposed project areas are pine beetles, fir engraver beetles and scolytus bark beetles that can infest and kill different species of pine and true fir trees. Small (less than one acre) patches of ponderosa pine have been killed and are currently being attacked by bark beetles. Many of these pines are very large with diameters ranging from 12 to 60 + inches dbh. The large pines are generally suffering from crowded growing conditions with dense stands of true firs encroaching upon the pine clumps. These crowded growing conditions often leave the pines in weakened condition and more susceptible to insect and disease mortality. In addition, on-going mortality from fir engraver beetles throughout all of the white fir stands is occurring.

Plant communities in the EA analysis area are generally within those plant associations described by Hopkins (1979) for the Klamath Ranger District, Winema National Forest or by Atzet and McCrimmon (1990) for the Southern Oregon Cascade Mountain Province.

Special Status Species

Vascular Plants

The proposed timber sale area was surveyed for botanical resources in 2003. Three patches of green-flowered wild ginger (*Asarum wagneri*) were found within the area. Green-flowered wild ginger was a Bureau sensitive species at the time of the survey, but subsequent changes in the Oregon/Washington special status species lists removed green-flowered wild ginger from any of these lists.

Nonvascular Plants

Surveys are not required for nonvascular cryptogams on the Klamath Falls Resource area. However surveys were done in and around the project area under the former Survey and Manage guidelines. No Special Status nonvascular cryptogams were found.

Table 4 lists special status nonvascular plant species that are documented or suspected in the resource area. The range and habitat of these species is not well known. Extensive surveys under the former Survey and Manage program identified some habitat requirements for some of these species. Management of known sites, conservation assessment plans and ongoing data collection will help better identify potential habitat.

Table 4: Special Status nonvascular plant species that could occur in the project area

Taxa	Species	Special Status Category	Suspected or Documented
BR	<i>Calliergon trifarium</i>	BAO	S
BR	<i>Chiloscyphus gemmiparus</i>	BSO	S
BR	<i>Helodium blandowii</i>	BAO	S
BR	<i>Meesia uliginosa</i>	BAO	S
BR	<i>Splachnum ampullaceum</i>	BAO	S
BR	<i>Tripterocladium leuocladulum</i>	BAO	S
BR	<i>Tritomaria exsectiformis</i>	BAO	S
FU	<i>Boletus pulcherrimus</i>	BSO	D
FU	<i>Rhizopogon ellipsosporus</i>	BSO	S
LI	<i>Texosporium sancti-jacobi</i>	BAO	S

BAO (Bureau Assessment-Oregon), BSO (Bureau Sensitive-Oregon)

Noxious Weeds

The proposed timber sale area was surveyed for botanical resources in 2003. No noxious weed populations were found in the timber sale area.

Vegetation - Environmental Consequences

Upland Forest

No Action

This alternative would result in no immediate timber harvesting or thinning in the proposed project area, although other timber harvests are proposed in the 5th field watershed in 2008-2012 (Table 3). Given the current successional trajectory, continued tree mortality from insects, disease, and competition for water and nutrients would occur in the proposed Buck 13 Timber Sale area. The resulting accumulation of dead material would add to the already existing high fuel loads. The potential for high intensity wildfires would likely continue to increase.

Cumulative Effects – No Action

At the 5th field watershed scale, the greatest change in vegetation would likely occur on private lands. Industrial forest management objectives normally result in shorter rotations and a higher percentage of early seral habitat. Oregon Forest Practices law requires prompt reforestation resulting in primarily ponderosa pine plantations fully stocked within five years. On BLM lands, vegetation changes would be relatively indiscernible at the watershed scale. Canopy closure from the dominant and co-dominant trees would be retained. Snag recruitment would continue. Most change would occur to vegetation and residual slash near or on the ground from slashbusting and underburning proposed in other projects. The proposed timber sale area (29 acres) comprises less than one tenth of one percent of the Spencer Creek Fifth Field Watershed (approximately 54,160 acres).

Proposed Action

The proposed action includes 15 acres of regeneration harvest, nine acres of density management and five acres of aspen restoration. The Regeneration Harvest area (about 15 acres) would result in removal of 60-80% of the existing basal area. It is estimated that less than 35 percent canopy closure would be retained within the Regeneration Harvest Unit. After harvesting, it would be reforested with less shade tolerant species including ponderosa pine. The project design feature to retain a minimum of 16 to 25 large green trees per acre in the Regeneration Harvest area would reduce the impact to species dependent upon late seral habitat by maintaining some connectivity,

crown closure, and residual large tree structure. With the additional light on the forest floor more understory vegetation would be expected to grow including grass, forbs, brush and tree seedlings.

The proposed nine acres of density management in combination with follow-up fuel reduction treatments (whole tree yarding, lop/scatter & jackpot burning) as proposed, would continue to maintain connectivity and late successional habitat over time by retaining a high percentage of the healthier older/larger trees (Figure 3). Density management would increase the resiliency of the reserved trees by reducing competition for light, water and nutrients. Density management and the fuels treatments would also help to restore desired species composition as described in the RMP (page E-10) and reduce the risk of a stand replacement wildfire. Canopy closure in the more densely stocked stands would be reduced, but it is estimated that 50 percent or more of the existing canopy closure would be retained after treatment. Some larger (20+ inches DBH) trees would be harvested; however, most of the late seral structure and function would be maintained. The silvicultural prescription also directs culturing around high value, mature pines. In many instances, these trees are 30 to 60+ inches in diameter. In the proposed timber sale the trees marked for cutting around these large, old trees are the more shade-tolerant encroaching white firs that range in diameter from 8 to 24+ inches dbh. Forest health would be improved in the density management areas resulting in a decreased risk of mortality due to disease, insects, wildfire, and competition.

The canopy closure in approximately five acres of aspen restoration would be substantially reduced. Only trees 24 inches dbh and larger would be retained. Reducing canopy closure in conjunction with broadcast and/or pile burning would stimulate aspen clone sprouting. Additional light on the forest floor would stimulate growth of grass, forbs and brush. The proposal to rest the sale area from grazing for at least three years would help to further establish the aspen and other understory species.

Figure 3 –Density Management – Take versus Leave Trees for the Buck 13 Timber Sale
BUCK 13 RIPARIAN TREATMENT

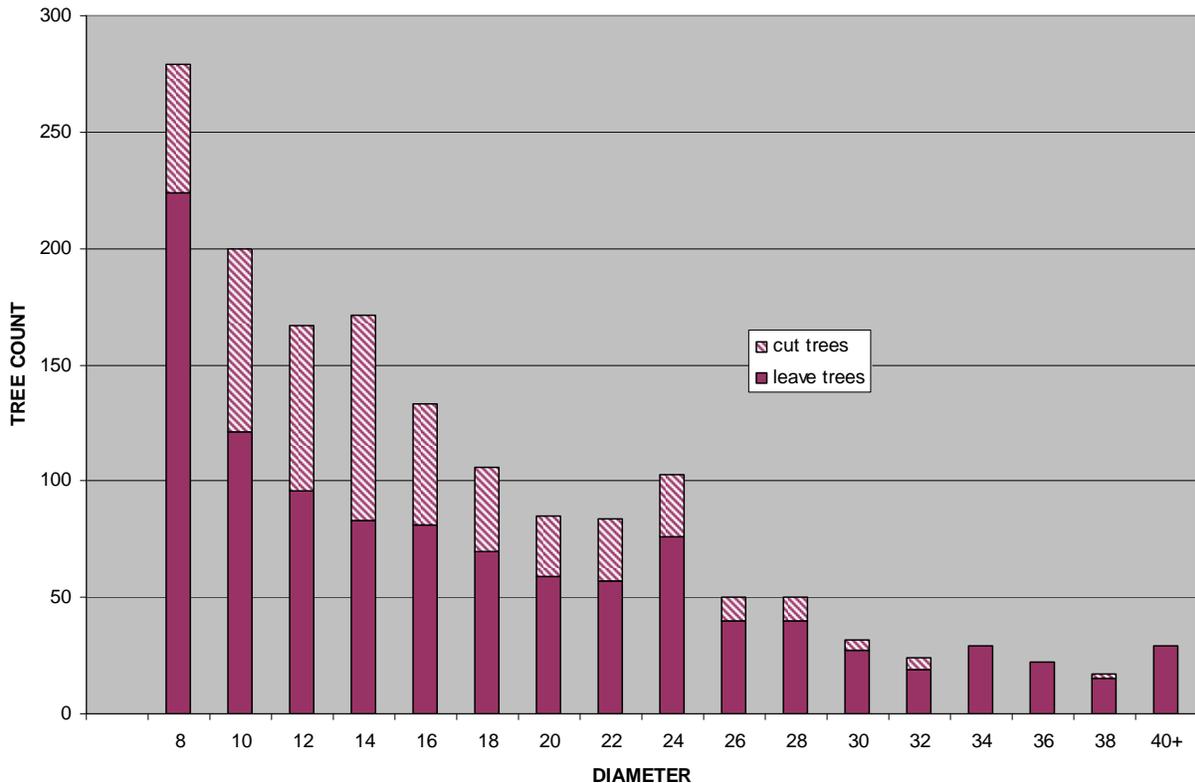
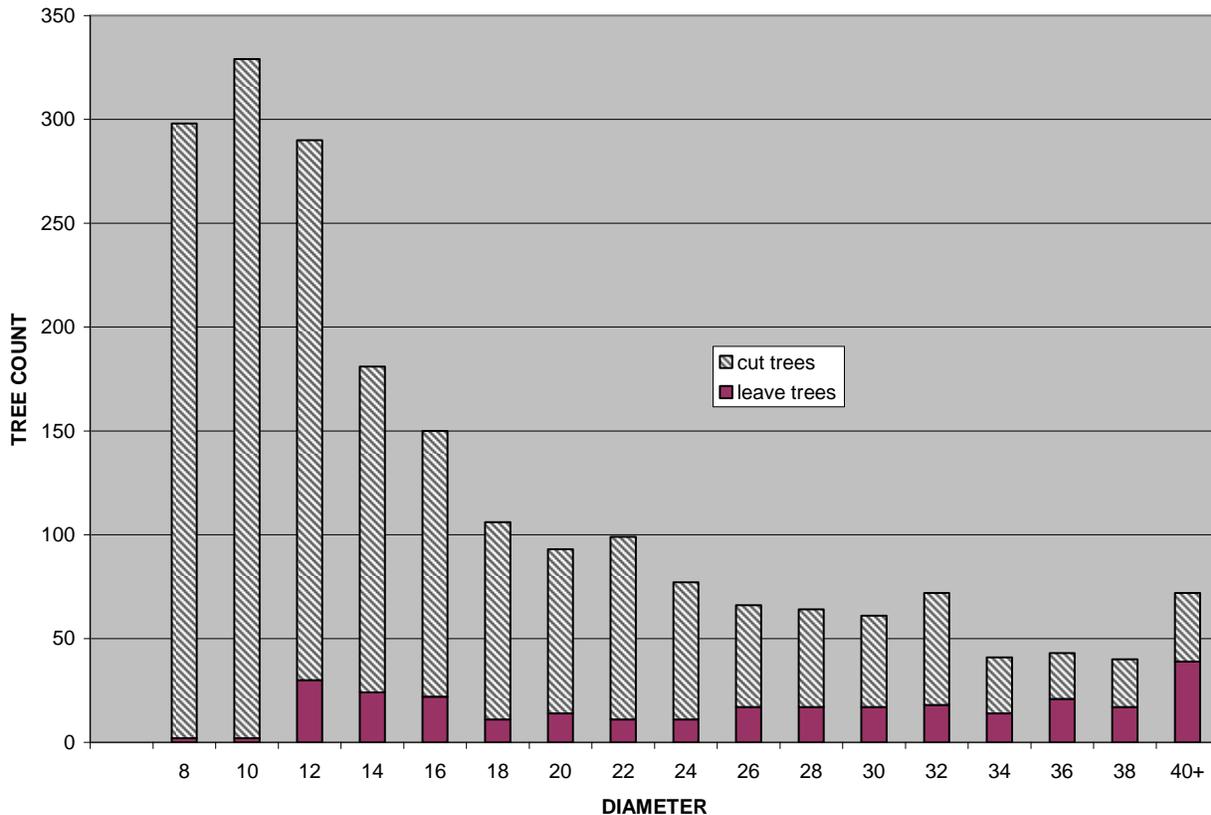


Figure 4 – Matrix Regeneration Treatment - Cut versus Leave Trees for the Buck 13 Timber Sale

BUCK 13 REGENERATION TREATMENT



Assessment of 15% Standard and Guide

The Northwest Forest Plan and the KFRA RMP state federal agencies must retain on federal lands a minimum of 15 percent of the late successional forests within a fifth field watershed (RMP page 23). Guidance from the Regional Ecosystem Office (Feb. 3, 1998) indicates that the 15 percent standard and guide applies only to commercial forest lands and at a minimum, implement the 15 percent standard and guide on the lands they manage within the watershed until further guidance is adopted. The proposed treatments would meet this criterion.

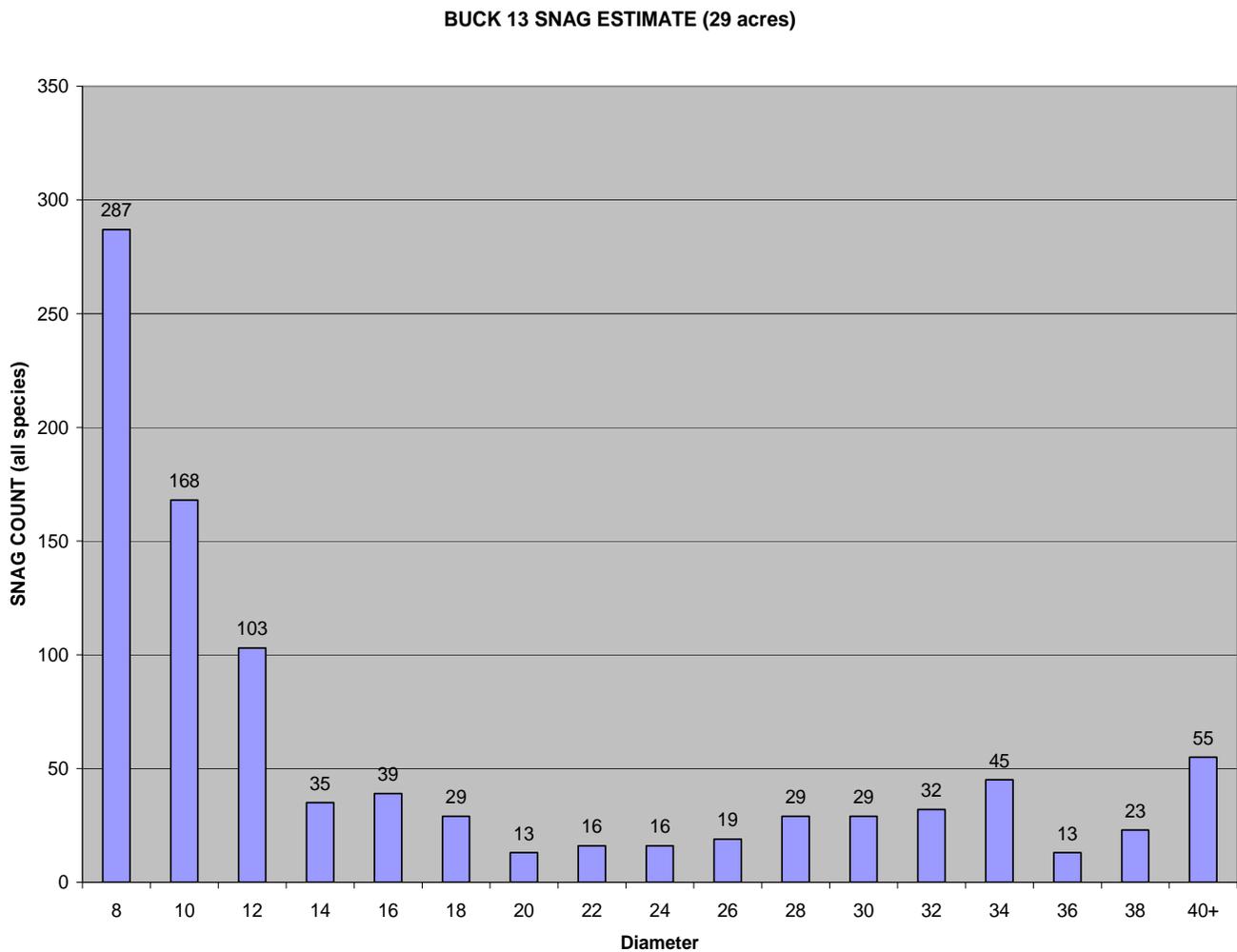
Cumulative Effects - Proposed Action

In the last decade, since the signing of the RMP in June of 1995, the KFRA has thinned, using density management prescriptions, approximately 6,000 acres north of Highway 66. Approximately 1,710 acres of the density management and 165 acres of regeneration harvest occurred in the 54,160 acre Spencer Creek Fifth Field Watershed where the proposed Buck 13 Timber Sale is located. Together, the density management and regeneration add up to approximately 1,875 acres that represents approximately 3.5 percent of the Upper Spencer Creek Fifth Field Watershed. The general density management prescription has been to harvest approximately 25-35% of the basal area in a stand. The harvested trees consist primarily of the understory, poorer growing, suppressed, and intermediate trees. A much lower percentage of co-dominant and dominant trees are harvested. The effects of these harvest treatments have been monitored and are documented in the Annual Program Summary and Monitoring Reports (BLM 1999-2007). In summary, the desired future conditions stated above have been met both at the project level and the landscape level through density management prescriptions.

The effect of the Proposed Action on BLM-managed lands, combined with future actions on private lands would result in the following effects. No change in age or seral classification of stands on BLM lands within the watershed. Generally, the seral classification of BLM lands would remain as mid to late seral as the structural and functional composition of the stands would continue after treatment. The proposed timber sale area of 29 acres comprises less than one tenth of one percent of the approximately 54,160 acre Spencer Creek Fifth Field Watershed. The proposed 29 acres of harvest activities combined with the currently planned 2,792 acres of future timber sale activity amounts to about five percent of the Spencer Creek Fifth Field Watershed. As stated above, the greatest change in vegetation would likely occur or already has occurred on private lands with an increased percentage of early seral habitat.

Effects to forest vegetation from implementation of the 15 acres of regeneration harvest, nine acres of density management and five acres of aspen restoration described in this alternative would not exceed those analyzed in the KFRA FEIS.

Figure 5 – Existing Snag Estimate for the Buck 13 Timber Sale



Special Status Species

No Action

Vascular Plants

Since no populations of species from the current lists of special status plant species are known to occur in the project area, no effects on these species are expected. The three small patches of green-flowered wild ginger found in the project area represents a reduction in this species from earlier surveys. This could be attributed in part to the increase in duff and down and dead woody material. Under the no action alternative the decline in the green-flowered wild ginger population would be expected to continue.

Nonvascular Plants

After extensive analysis conducted under the former Survey and Manage program, the FSEIS to Remove or Modify the Survey and Manage Mitigation Measures Standards and Guidelines (BLM/USFS 2004) concludes that little is known about the habitat, geographic range or population biology for nonvascular species. It is difficult to predict how these species would be affected under the No Action alternative. Although no special status nonvascular plants were found, negative survey results do not indicate that these species are not present. The one Bureau sensitive species that is documented on the Klamath Falls Resource Area (*Boletus pulcherrimus*) has only been found on the resource area in higher elevation forests. If undocumented Special Status species are present, increased tree mortality and partial fuel treatments may create additional habitat. However, increased fuel accumulation could result in wildfire intensity beyond historic levels under which these species evolved.

Proposed Action

Vascular Plants

No populations of species from the current lists of special status plant species are documented to occur within the proposed project area. Therefore, special status plant species are not expected to be affected by timber sale or prescribed fire activities under the Proposed Action. Although the population of green-flowered wild ginger may be directly affected to some extent by the mechanical disturbance associated with project activities, the reduction of shade and forest floor debris may result in an increase in the green-flowered wild ginger population in the long term.

Nonvascular Plants

No special status nonvascular plants were found during pre-disturbance surveys. While negative survey results do not prove that species are not there, special status nonvascular plants that could be present are expected to be affected minimally or not at all from the Proposed Action. Best Management practices that protect soil and wildlife will also help in retaining microsite characteristics for most nonvascular plants.

Cumulative Effects – Both Alternatives

Vascular Plants

At the project level, no cumulative effects to special status vascular plant species are expected from either alternative because none of these species were located within the project area. At the watershed level, the cumulative actions (thinning and prescribed fire) may indirectly have a positive affect on some species by creating habitat to which these species may be adapted.

Nonvascular Cryptogams

Neither alternative would cause negative cumulative effects on nonvascular cryptogams. Existing reserves, best management practices, and continued monitoring of known sites on the Klamath Falls

Resource Area will help maintain the habitat for these species. A well distributed network of connected and extensive late successional forests is an important habitat component for nonvascular species (BLM/USFS 2004, Vol.1, pp141-176). The Record of Decision for the FSEIS To Remove or Modify the Survey and Manage Mitigation Measures Standards and Guidelines states that the agencies special status species policies, the reserve system, and matrix standards and guidelines that provide for retention of legacy elements will still provide for diversity of plant and animal communities and conserve rare and little known species.

The proposed project includes harvesting timber in only 29 acres of the approximately 54,160 acre Spencer Creek watershed. Therefore, on a watershed scale, any impacts to special status species, beneficial or negative, would be minimal.

Noxious Weeds

No Action

Although the activities described in the proposed action would not occur, effects resulting from other proposed activities (including fuel treatments, road maintenance, etc.) would occur as described in NEPA documents pertinent to those projects. These actions would result in some ground disturbance, creating conditions that favor the invasion of noxious weeds from outside the project area and contributing to the spread of noxious weed populations already present within the project area. BMPs and PDFs similar to those described for the Proposed Action would be implemented for any BLM project and would serve to reduce the potential for these impacts. A notable exception would occur in the event of a large-scale, high intensity wildfire. Under such circumstances, there may not be time to implement certain precautions to avoid spreading weed seeds (washing machinery before entering an area, etc.) and large areas may be stripped of vegetation creating a suitable environment for weed establishment.

Proposed Action

The use of mechanical equipment for timber harvest activities may create the disturbed conditions under which many noxious weeds have a competitive advantage. The vehicles and machinery entering the project area to implement these treatments would increase the potential for the introduction of noxious weeds into the area from sources outside the project area. Project design features for the prevention of the introduction of noxious weed seeds and plant parts would reduce the potential for the dispersal of these species into the project area (See Appendix B).

Cumulative Effects – Both Alternatives

The cumulative effects of past, present and, future treatments in the watershed include disturbance of the soil and existing vegetation and increased potential for the introduction and spread of noxious weeds, whether or not the Proposed Action is implemented. The potential cumulative effect of any combination of treatments would be to increase in the number of noxious weeds species and the areas occupied by noxious weed species. However, the KFRA has developed and implemented PDFs and BMPs for weed prevention and soil protection, and these measures have been demonstrated to be effective in reducing the introduction and spread of weeds. These measures (Appendix B) will continue to be implemented; therefore, noxious weeds are not expected to increase in distribution from the implementation of the proposed activities. Unplanned actions (i.e., large-scale, high intensity wildfire) could increase weed distribution.

Fuels - Affected Environment

The approximately 15 acres of matrix and nine acres of riparian reserve areas proposed for commercial harvest are dense mixed conifer forests containing heavy loading of large woody fuels.

The fire behavior fuel model that best describes the analysis area is TL5: High Load Conifer Litter. Fuel loads in the matrix are estimated at 43 tons per acre. Fuel loading in the riparian reserve is much lower than the rest of the analysis area, and is estimated to be six tons per acre. Surface fuels are patchier in the riparian reserve and lack the heavy accumulation of large fuels.

All lands with the proposed project area have been classified as being in Fire Regime 1, Condition Class III. Under a natural fire regime, the Northern California Mixed Conifer BioPhysical Setting has primarily short-interval (e.g., 10-20 yr) surface fires with occasional mixed severity and replacement fires (e.g., 30-100 yr intervals). The condition class reflects the high departure from the natural regime. The fire regime has been substantially altered from its natural (historical) range. The risk of losing key ecosystem components is high. The fire frequency has departed from natural frequencies by multiple return intervals. A dramatic increase has occurred in potential fire intensity and severity. Stand structure and composition have been substantially altered from their natural (historical) range.

Fuels - Environmental Consequences

No Action

Under the no action alternative, surface fuels would continue to accumulate. With the continued lack of treatment of fuels, the likelihood of a wildfire occurring in these stands is increased. Wildfire during the dry summer months would quickly propagate into the canopy of the stand due to the loading of surface fuels, tight canopy spacing, and low canopy height. This intensity, combined with the fire's long residence time in these fuels would likely lead to complete stand replacement within the fire perimeter. Site conditions and fire intensity dictate that suppression of such a fire would likely require dozers and other heavy machinery.

Proposed Action

The fuel treatments proposed for the 15 acres of matrix and nine acres of riparian density management described in the proposed action would reduce overall fire hazard. The whole tree yarding, lop and scatter and piling and burning of fuel concentrations and adherence to the PDFs and BMPs for fuels reduction in Appendix B are expected to change the fire behavior model to TL3: Moderate Load Conifer Litter. The risk of a stand replacing fire would be reduced thereby providing a greater assurance of maintaining desired habitat. Minimal prescribed fire mortality of the reserve trees would be expected since burning would be limited to piles and slash concentrations that would be located away from reserve trees. The stand-level Condition Class is expected to decrease to II due to decreased wildfire severity and similarity to historic stand structure and composition.

The fuel treatments proposed for the five acre aspen restoration area were designed to reduce fuels and stimulate aspen regeneration. Whole tree yarding of all conifers smaller than 24 inches dbh would reduce canopy fuels and may contribute some ground fuels in the form of limbs and broken tops. The proposed slashing and lopping and scattering of all un-merchantable conifers in the aspen area would help to create a uniform fuel bed for subsequent prescribed fire implementation. The underburn in the aspen area would reduce surface fuels while producing a sprouting response from the aspen clones. Some mortality would be expected in the reserved conifers and aspens. Mortality would be limited by placing slash away from the immediate vicinity of the reserve trees.

Cumulative Effects

On a landscape or Fifth Field Watershed scale, the 29 acres being analyzed in the proposed action represent a very small portion of the 54,160 acre watershed. A maximum of 24 acres would be burned under the proposed action and thus this small amount of acres treated would have no

substantial measurable effect on the watershed's Condition Class or wildfire hazard. However, the cumulative effective of this project in addition to the previous Kacapoo, Spencer and Surveyor fuels treatments, and the proposed Tunnel Creek, Clover Creek and Miners Creek fuels treatments will have an overall positive effect on Condition Class and wildfire hazard.

Air Quality - Affected Environment

Air quality is a sensitive issue in the Upper Klamath Basin primarily because of the existing threat of returning to a state of "non-attainment." National Ambient Air Quality Standards (NAAQS) were established by the 1963 Clean Air Act and subsequent amendments to protect the public health (primary standards) and public welfare (secondary standards) from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air. In 2006, EPA revised the 24-hour NAAQS for PM_{2.5} downward from 65 to 35 µg/m³. If the particulate matter for NAAQS is exceeded, the EPA is required to designate the area as a "non-attainment" area.

Air pollutants are emitted from a variety of sources in the Basin including woodstoves, open burning, industrial plants, and internal combustion engines. Woodstoves contribute greatly to particulate matter during the winter. Agricultural and forestry burning operations are significant sources in the fall and spring. With the emphasis on reducing risk of wildfire, fuels reduction projects using prescribed fire are also a common source of pollutants that can contribute to reduced air quality.

On March 22, 2007, the EPA issued The Treatment of Data Influenced by Exceptional Events (EPA 2007) to integrate the public policy goals of, 1) using fire to restore healthy ecosystems, and 2) mitigating the impacts of air pollutant emissions on air quality and visibility. The Exceptional Events Rule was written to ensure that prescribed burns needed to protect the natural ecosystem would not result in "non-attainment" status.

Mountain Lakes Wilderness is a smoke sensitive Class I areas during the visibility protection period (July 1 to September 15). The wilderness is located two miles northeast of the analysis area.

Planned prescribed fires would be consistent with the Clean Air Act and the Oregon Smoke Management Plan (OAR Chapter 629, Division 48).

Air Quality - Environmental Consequences

No Action

Under the no action alternative, air quality impacts are typically very localized and only result from vehicles stirring up dust and from campfire smoke. For other prescribed burns in Tunnel, Clover and Spencer Creek areas (see Table 3 above) any smoke emissions are planned to be in compliance with the Oregon Smoke Management Plan. As untreated stands continue to grow denser and as fuels continue to build up, there is a gradually increasing potential for large wildfires, which would have limited-duration air quality impacts. Wildland fire is a stochastic event and smoke and particular matter cannot be anticipated.

Proposed Action

Air quality impacts would be slightly higher in the short term than the No Action Alternative because of the burning and an increase in vehicles and equipment used to implement the actions stirring up dust. No additional impacts to air quality from campfire smoke over the No Action Alternative are expected because no measurable increase in recreation use is expected.

Total emission of PM_{2.5} is predicted to be 11 tons. If the residual landing pile material is not utilized, the burning would emit an additional 3 tons of PM_{2.5}. Due to the ability to manage emissions from prescribed fire (through timing burns with projected weather patterns) the air quality goal should be met. This alternative has greater short-term impacts, but should have a lesser impact on air resources from wildfires in the long-term. Due to the relative isolation of the area and the predominant wind patterns for smoke dispersion, the probability of degrading any key air-shed with this project is low. These local impacts would be transitory in nature and no long-duration smoke impacts are expected.

Prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan (OAR Chapter 629, Division 48). All ignitions will comply with direction in the Smoke Management Forecast and Instructions. Prescribed burning is not expected to affect visibility within nearby smoke sensitive Class I areas (Mountain Lakes Wilderness) during the visibility protection period (July 1 to September 15). Prescribed burning is not routinely conducted during this period primarily due to the risk of an escape wildfire.

Prescribed burning emissions are not expected to adversely effect annual PM_{2.5} attainment within Klamath Falls, or the Medford non-attainment area. Any smoke intrusions into these areas from prescribed burning are anticipated to be light and of short duration. Prescribed burning would also be planned during the fall, winter and spring months to reduce damage to the site from high intensity burning and to facilitate control of the units being burned. Smoke retained on site could be transported into portions of non-attainment areas if it is not dispersed and diluted by anticipated weather conditions, however, current avoidance strategies for prescribed fire assume that smoke can be lifted from the project site and dispersed and diluted by transport winds.

Cumulative Effects

Smoke and other airborne particulates are short lived, generally remaining in the air for less than a month. Depending on climactic conditions, this may be of considerably less duration. However, the cumulative effective of this project in addition to the previous Kacapoo, Spencer and Surveyor fuels treatments, and the proposed Tunnel Creek, Clover Creek and Miners Creek fuels treatments would be minimal and likely not measurable. Consequently, no significant cumulative effects are anticipated under either alternative.

Terrestrial Wildlife Species – Affected Environment

This section focuses on those species considered special status species that may be affected from management activities. These will include those species listed under the Endangered Species Act (ESA - listed, proposed and candidate species), those species listed under the BLM special status species policy as Bureau Sensitive and land birds classified as Species of Concern by the U.S. Fish and Wildlife Service. Table 5 is a list of terrestrial wildlife species that were considered during the analysis for this EA. For a list of other species and a description of their habitat that may occur in the proposed project area, refer to the Klamath Falls Resource Area FEIS (pages 3-37 to 3-41). A complete list of BLM Special Status Species that occur on the Lakeview District, Klamath Falls Resource Area may be found at <http://www.fs.fed.us/r6/sfpnw/issssp/agency-policy>.

Table 5: List of species associated with the habitat types occurring in the project area that may be affected by the project actions.

Type	Common Name	Scientific Name	Status	Key Habitat Association within the KFRA	Comments
Bird	Northern Spotted Owl	<i>Strix occidentalis caurina</i>	Federally Threatened	Foraging- Mature/Late Successional Mixed Conifer Nesting – Mature/Late Successional Mixed Conifer	No known nest territories within the Project Area. No designated critical habitat. Suitable habitat occurs within project
Bird	White-headed Woodpecker	<i>Picoides albolarvatus</i>	BLM Sensitive/ FWS BCC	Foraging - Large Ponderosa Pine Nesting – Large Snags	May occur within the Analysis Area
Bird	Northern Goshawk	<i>Accipiter gentilis</i>	FWS BCC	Foraging -Mature Mixed Conifer Nesting – Mature Mixed Conifer	May use the project area for foraging.
Bird	Flammulated Owl	<i>Otus flammeolus</i>	FWS BCC	Foraging -Open Mixed Conifer Nesting - Snags	May occur in the Analysis Area
Bird	Great Gray Owl	<i>Strix Nebulosa</i>	Formerly Survey and Manage	Foraging – Meadow or open forest habitat Nesting – Broken top trees, old raptor nests, natural platforms	Surveyed no great gray owls detected
Mammal	Pallid Bat	<i>Antrozous pallidus</i>	BLM Sensitive	Roosting – Primarily caves, rocks but may use large snags	May occur in the Analysis Area
Mammal	Fringed Myotis	<i>Myotis thysanodes</i>	BLM Sensitive	Roosting – Primarily caves, rocks but may use large snags	May occur in the Analysis Area
Terrestrial Mollusk	Evening Fieldslug	<i>Deroceras hesperium</i>	BLM Sensitive/ Formerly Survey and Manage	Moist forest in low vegetation, litter, debris, rocks	Surveyed no special status mollusks found
Terrestrial Mollusk	Crater Lake Tightcoil	<i>Pristiloma arcticum crateris</i>	BLM Sensitive/ Formerly Survey and Manage	Moist to wet sites such as riparian areas, near springs, wetlands and mountain meadows.	Surveyed no special status mollusks found
Terrestrial Mollusk	Chase Sideband	<i>Monadenia chaceana</i>	BLM Sensitive Formerly Survey and Manage	Talus and rock slides, dry conifer and oak woodlands	Surveyed no special status mollusks found

FWS BCC – U.S. Fish and Wildlife Service Birds of Conservation Concern 2002

BLM Sensitive- Those Species considered By the Bureau of Land Management as a sensitive species

Federally Threatened – Those Species listed under the Endangered Species Act as Threatened

Threatened and Endangered Species

Northern Spotted Owl (*Strix occidentalis caurina*) - Federally Threatened

The proposed timber sale area is not within any known spotted owl territory. The closest spotted owl site is approximately 1.3 miles to the southeast.

The proposed project area is outside of designated critical habitat however the proposed timber sale unit is classified as suitable spotted owl habitat. The project area is approximately 29 acres and those acres are classified as suitable habitat. This stand of trees is an isolated patch of old forest surrounded by harvested private lands, Buck Lake (a drained lake bed predominately on private land used for cattle ranching) and Forest Service lands to the east that have also been harvested.

Spotted owl habitat definitions (RMP/EIS 1995)

Suitable habitat – Comprised of coniferous stands that satisfy the full complement of daily and annual needs of the owls for nesting, roosting and foraging. Typically these are mature forest stands, multi-structured with canopy closures that exceed 60%.

Dispersal Habitat – Coniferous forest stands that allow spotted owls to move across the landscape with some level of security until they find blocks of unoccupied suitable habitat. Generally canopy closure exceeds 40%.

Within the Spencer Creek Watershed there are approximately 13,654 acres of spotted owl suitable habitat and 4,354 acres of spotted owl dispersal habitat (Table 6). Since 1994 there have been three timber harvests that have occurred in the watershed that have downgraded suitable habitat to dispersal habitat (Table 8). No dispersal habitat has been downgraded.

Table 6: Spotted Owl Suitable and Dispersal Habitat Currently Available Within the Spencer Creek Watershed

Ownership	Total Acres	Suitable Habitat Acres	Dispersal Habitat Acres
Bureau of Land Management	8,745	4,036*	3,241
U.S Forest Service	22,273	9,618	1,113
Private**	23,175	0	0
Total	54,193	13,654	4,354

*Timber Sale acres that removed suitable habitat since 1994 have already been removed from this total

**Private lands are assumed to provide no suitable or dispersal habitat for this analysis even though there is likely some habitat within the watershed that would provide dispersal or suitable habitat on private lands. This was done because it is assumed that most or all of the private forest lands within the Spencer Creek Fifth Field Watershed will be converted to early seral conditions.

Special Status Species

The project area was surveyed for some special status species including those formerly classified as Survey and Manage. As of 2007 (USDI 2007) the BLM removed the requirement to survey for species classified as Survey and Manage under the Northwest Forest Plan.

Surveys were completed to protocol for the great gray owl, terrestrial mollusks and aquatic mollusks. No great gray owls or special status mollusk species were found during these surveys therefore no effects would occur to these species or their habitat. They will not be analyzed further in this document.

The proposed project area does contain suitable habitat for other special status species including the white-headed woodpecker, northern goshawk, flammulated owl, pallid bat and fringed myotis. It is assumed that these species use the project area and no specific surveys were conducted.

No known northern goshawk nest sites occur in the project area. The project area is a small isolated stand that would not likely support a goshawk nest site however the area may be used as foraging habitat.

The Klamath Falls Resource Area was surveyed for forest carnivores (Target species included: Canada lynx, wolverine, Pacific fisher and American marten) in 1998-2001 including the Spencer Creek Watershed. American marten was the only target species located during these surveys. In the winter of 2006 surveys were also conducted on the Fremont-Winema National Forests portion of the Spencer Creek Watershed. Again the American Marten was the only targeted carnivore detected.

The Pacific fisher historically occurred within the Spencer Creek watershed but declined over the first part of the 20th century (BLM 1995). There was a reintroduction attempt in the 1960s at Buck Lake but that attempt was not considered successful. The fisher is listed as a Federal Candidate species (USDI 2004) and its current range is thought to be limited to two populations in Oregon, the Southern Cascade Mountains and the Siskiyou Mountains of Southwestern Oregon. No confirmed sightings have occurred in the project area or within the Spencer Creek watershed. The closest recent confirmed detection was a male fisher detected on the Fremont-Winema National Forests in the spring of 2006 on the south-side of Pelican Butte approximately 15 miles to the north of the project area (ODFW pers comm. 2006).

Terrestrial Wildlife Species – Environmental Consequences

Threatened and Endangered Species

No Action

No direct or indirect impacts are anticipated from implementation of the no action alternative. This alternative would not modify the current habitat for the northern spotted owl. The proposed project area is a small isolated stand and is not within a known nest territory therefore it is assumed that if used by spotted owls it predominately would be used as foraging or dispersal habitat. This function of the habitat would not change under the No Action Alternative. The forest stand would remain in its current condition and provide for foraging and dispersal habitat.

Proposed Action

Northern Spotted Owl

No spotted owl nest territories or designated critical habitat occur within the project boundary. Therefore no direct effects on spotted owls from the proposed project are anticipated. The closest spotted owl activity center is approximately 1.3 miles away. There is, however, approximately 29 acres of suitable habitat within the project. Suitable habitat has those characteristics that could support spotted owls and is considered to have the nesting, roosting and foraging components needed for owls. Typically these are older coniferous forest stands with multi-story structure, high canopy closure and a diversity of snags and coarse woody debris. This forest stand is an isolated

patch of trees and would not likely provide a core nest area for a spotted owl. It would potentially provide foraging and dispersal habitat.

The proposed regeneration and density management harvests would simplify the stand structure and reduce overall canopy closure. The 15 acres of regeneration harvest would reduce overall canopy closure of the entire stand below the threshold suitable for nesting or roosting habitat therefore downgrading the suitable habitat to dispersal only habitat. Although no longer nesting habitat, the habitat would still function as dispersal habitat. The 16-25 large trees per acre within the 15 acres of regeneration harvest plus the remaining 14 acres of density management thinning would maintain the stand as functional dispersal habitat. Additionally the forest stands post harvest would provide a minimum of 2.4 snags/acre and 120 linear ft of CWD to provide structure for the dispersing owls. Currently there are approximately 30 snags/acre with 12 of those snags/acre with a DBH of > 16 inches and no snags are proposed for cutting unless required for human safety (see Figure 5).

In 1994, the Spencer Creek Watershed had an estimated 15,053 acres of suitable habitat on federal lands. In 2007, there are approximately 13,654 acres of suitable habitat remaining on federal lands (Table 6). This reduction in habitat is primarily from timber harvest (Table 7). For this analysis the private lands are assumed to not provide suitable or dispersal habitat for the spotted owl. In-growth of suitable habitat on BLM lands has not been assessed at this time and therefore was not calculated in this analysis.

Table 7: Completed projects within the Spencer Creek Watershed that removed Spotted Owl Habitat since 1994

Completed Treatment	Year	Acres Suitable Habitat Downgraded	Acres Dispersal Habitat Removed
Kakapo Timber Sale	1997	270	0
Clover Hook-Up Timber Sale	2000	1,003	0
Surveyor Mountain TS*	2004	126	0
Total	--	1,399	0

*346 acres of the 406 acres for the Surveyor Mountain TS occurred in the Spencer Creek Watershed. The other sales were completely within the watershed.

The proposed sale has approximately 29 acres of spotted owl suitable habitat that would be downgraded to dispersal habitat after the proposed timber harvest. This equates to less than 1% of the total acres of suitable habitat within the watershed and therefore would not appreciably diminish spotted owl habitat from its current composition.

The cumulative effect of this proposed action when added to other past, present and known future actions is very small. The Klamath Falls Resource Area five year action plan does have seven timber sales, four prescribed fire areas and two mechanical fuels treatments proposed within the Spencer Creek watershed (Table 8). The timber sales are the only actions proposed that would likely result in the loss or downgrading of suitable or dispersal habitat. The other proposed actions are designed to maintain suitable habitat through project design features that retain structure needed to maintain spotted owl suitable habitat.

The timber sales within the Klamath Falls Resource Area have predominately been harvested through density management prescriptions with a small percentage of regeneration harvest (see

Table 2). Therefore it is reasonable to assume that similar harvests will likely occur on future timber sales. In past density management units, spotted owl suitable habitat was typically maintained within the higher quality suitable habitat. For this analysis it is assumed that those habitats would be maintained and lesser quality suitable habitat would be down graded to dispersal. In regeneration harvest units, suitable habitat would also be downgraded to dispersal habitat. Since dispersal habitat has not been removed by timber harvests over the past 10 years it is also assumed that no dispersal habitat would be removed in the foreseeable future within the watershed on federal lands.

Table 8: Suitable habitat affected by additional actions proposed on BLM lands within the Spencer Creek 5th Field Watershed

Treatment	Approximate Volume	Approximate Acres	Estimated Acres of suitable habitat removed from proposed actions*
Timber Sales*			
Buck 15	2.92 MMBF	467	415
Portion of Buck 23 **	2.87 MMBF	765	0
West Spencer	2.00 MMBF	800	100
Mid Spencer	3.00 MMBF	650	340
Portion of Kent Oval**	.16 MMBF	25	0
Portion of Cherry Glade**	.28 MMBF	55	15
Portion of North Frosty**	.03 MMBF	30	0
Land Exchanges/Sales			
Charley Land Trust	.04MMBF	3	0
Prescribed Fire			
Tunnel Creek DDR*		123	0
Clover Butte*		500	0
Clover Creek*		200	0
Lower Spencer Ck DDR		200	0
Mechanical Fuels Treatments			
Upper Spencer Ck DDR*		300	0
Miners Creek DDR*		300	0

*It is assumed that the prescription for the proposed timber sales will be primarily density management and therefore the higher quality (cat 1) suitable habitat will be maintained as suitable but the lower (cat 2) suitable habitat will be downgraded to dispersal

For the seven future timber sales proposed within the watershed there would be approximately 1,000 acres (Table 8) of suitable habitat downgraded to dispersal habitat through density management and regeneration harvests. This equates to approximately 25% of the suitable habitat on BLM lands within the watershed and approximately 9% of the remaining suitable habitat within the watershed (Table 9). No dispersal habitat would be removed.

The lands proposed for harvest are classified as matrix lands under the Northwest Forest Plan and the Klamath Falls RMP. These lands were allocated primarily for timber harvest but were also designed in conjunction with the riparian reserves to connect the larger reserve areas (LSRs) within the Northwest Forest Plan area designated for spotted owls and other late successional species (USDA/USDI 1994). Within the Spencer Creek Watershed there is part of the Mountain Lakes Wilderness and two LSRs - RO 227 and RO 228 on the Fremont-Winema National Forests.

Table 9: Summary of impacts to spotted owl habitat in the Spencer Creek Watershed

Ownership	Total Acres within Watershed	Current Suitable Habitat Acres within Watershed	Future Spotted Owl Suitable Habitat within Watershed	Percentage reduction of habitat **	Current Dispersal Habitat within watershed	Future Dispersal Habitat within watershed	Percent Reduction of Dispersal Habitat
Bureau of Land Management	8,745 (16%)	4,036	3,036	25%	3,241	3,241	0%
Forest Service	22,273 (43%)	9,618	9618	0%	1,113	1,113	0%
Private Lands	23,174 (41%)	0	0	0%	0	0	0%
Total	54,193	13,654	12,654	9%	4,354	4,354	0%

*After discussions with the Fremont-Winema National Forests Personnel the assumptions are that the Forest Service will maintain habitat within the Spencer Creek watershed and no actions are planned that would downgrade habitat within the foreseeable future.

** In-growth of suitable habitat on the BLM has not been measured since the RMP was signed therefore that habitat is not included in this calculation of overall habitat.

The proposed action along with the foreseeable actions will continue to provide a mix of dispersal and suitable habitat within the Spencer Creek watershed that would allow spotted owls to move to and from the large blocks of late successional habitat. This meets the purpose of the matrix lands for northern spotted owls. The Klamath Falls RA owl banding program continues to support this assumption. Dispersing spotted owls from the Klamath National Forest to the south and the Fremont-Winema National Forests to the north continue to be documented on the Klamath Falls RA as well as many unbanded spotted owls (Pers comm. KFRA Biologists 1990-2007).

These proposed actions continue to meet the intent of the Northwest Forest Plan and the Klamath Falls RMP in regard to the spotted owl by providing suitable and dispersal habitat connectivity to the larger blocks of reserved habitat.

Special Status Species

No Action

The No Action alternative would maintain current habitat conditions for white-headed woodpecker, bats and flammulated owls by continuing to provide large snags and large green trees. No direct or indirect impacts would occur to these species and current habitat would remain for the foreseeable future.

Proposed Action

White-headed Woodpeckers

The white-headed woodpecker is typically associated with open ponderosa pine or mixed conifer stands dominated by ponderosa pine (Marshal et al 2003). There is currently less than 1,500 acres of preferred habitat for the white-headed woodpecker within the Spencer Creek watershed (BLM 1995). This habitat is scattered throughout the watershed (BLM 1995). Considering the fragmented habitat and the relatively large home range needed in fragmented habitat it is likely the

white-headed woodpecker is scarce within the project area and the watershed. In fragmented habitat the home range for a white-headed woodpecker is approximately 130 acres (Altman B. 2000).

The proposed treatment would remove some trees that add to the suitable habitat for these species, primarily dead-top trees. However the majority of the harvesting would remove white-fir trees with an emphasis on ponderosa pine retention. Ponderosa pine snag retention and green tree retention guidelines (Appendix B) would maintain foraging and nesting habitat for these species (Bull et al 1990 as cited in Marshal et al 2003, Altman B. 2000).

No existing snags are planned to be cut unless required for safety (OSHA requirements). This would protect and maintain snag habitat that is currently available (see Figure 5). There is potential for loss of woodpecker reproduction if harvesting occurs during the nesting season. Some nest structure could be lost or disturbance near the nest site could result in nest failure. Thinning would continue to promote larger ponderosa pine trees in the stand which may benefit the white-headed woodpecker (Altman B. 2000). These woodpeckers use larger (>16") snags, dead-top and heart rot live trees for their nesting structure (Marshal et al 2003). Within the proposed project area there are approximately 12 snags/ acre greater than 16 inches DBH (Figure 5). The cumulative effect on white-headed woodpecker habitat of this proposed action when added to other past, present and known future actions is very small.

Flammulated Owl

The flammulated owl is typically associated with ponderosa pine stands exhibiting an open understory with patches of dense thickets for roosting. The owl typically uses larger >20" snags (Bull et al 1990 as stated in Marshal et al 2003) as nesting habitat and the open understory or adjacent grassy meadow areas as foraging habitat. Dense thickets of young ponderosa pine are used for day time roosts. The patch size of the current stand (29 acres) is below the average home range size (39 acres) of the flammulated owl (BLM 1995). Therefore the flammulated owl is not expected to use this stand of trees for nesting. No flammulated owls have been found in the analysis area during surveys and planning activities.

The proposed action would maintain current nesting structure by maintaining the available snags (BMPs and PDFs –Appendix B) and providing green tree retention for future snags. The proposed action is designed to retain the large ponderosa pine and remove predominantly white-fir. This would benefit the flammulated owl by retaining the larger ponderosa pine.

If the species is present within the project area there is potential for loss of reproduction if harvesting occurs during the nesting season (April – August). Some nest structure could be lost or disturbance near the nest site could result in nest failure. Daytime activities associated with the proposed project may disturb some nesting and foraging sites, but only in the short-term for the duration of harvest and fuel treatment activities. The cumulative effect on habitat of this proposed action when added to other past, present and known future actions is very small.

Pacific Fisher

The fisher is absent throughout most of its historic range. Sightings have been reported within the Spencer Creek watershed with one confirmed sighting approximately 15 miles north of the analysis area. However the minimum patch size for the fisher is 120-125 acres (BLM 1995). The proposed project is an isolated island of 29 acres surround by harvested private and federal lands. This project area would not be considered suitable habitat for the fisher due to size and current

habitat conditions surrounding the proposed project area. Therefore the proposed project would not directly or indirectly affect the fisher.

The Spencer Creek Watershed Assessment (1995) concluded that the late successional forest patch and the reserve areas under the Northwest Forest Plan combined within the Spencer Creek Watershed do not meet the needs of the fisher to provide connectivity between the larger blocks of Late Successional Reserves (BLM 1995). The cumulative effect of this proposed action when added to other past, present and those foreseeable future actions that reduce late successional habitat would not change this conclusion.

Fringed Myotis and Pallid Bat

This species may occur in the project area although they are generally associated with caves, mines or rock crevices. The fringed myotis are sometimes found using cavities in snags as roosts (Cross and Kerwin 1995). Weller (2001) found that the fringed myotis using snags switched roost areas often and did not show strong site fidelity as previously shown with other roost substrate. Snags typically used by fringed myotis are typically greater than 24 inches diameter at breast height and taller than 45 feet (Weller 2001). No snags are proposed to be harvested in the proposed action unless required for safety. The snag retention guidelines would maintain current snags and the green tree retention would provide for future roosting structure (Appendix B). The proposed project area has approximately 30 snags per acre. Of the existing snags, approximately nine snags per acre are 20 inches diameter and larger (see figure 5). Snag monitoring on past timber harvest on BLM lands have consistently shown that snag retention guidelines have been met and snags are well distributed within the watershed (BLM APS 1999, 2002).

Under the proposed action, short-term disturbance could push individuals from snags or thickets. These disturbances however would have a short duration and overall would have minimal impacts to the species. The existing snag and green tree retention levels (see BMPs and PDFs, Appendix B) would be sufficient to meet the needs of both species.

It is the policy of the BLM to protect, manage, and conserve special status species and their habitats such that any Bureau action will not contribute to the need to list any of these species under the Endangered Species Act. For special status species such as woodpeckers, owls, and bats the primary habitat components needed are large snags, large green trees and CWD. The standards and guidelines in the NWFP, additional guidelines in the KFRA RMP, and the project design provide for these habitat components to ensure that these actions do not further the need to list these species.

The cumulative effects of this project when considered with the others on both public and private lands within the Spencer Creek Watershed would not adversely affect the overall populations of special status species considered for this EA and would not contribute to the need to list these species under the Endangered Species Act. The PDFs, BMPs and Standards and Guidelines ensure that habitat components necessary for these species are maintained during implementation of projects.

Soils - Affected Environment

The U.S.D.A. Natural Resources Conservation Service (NRCS) classifies soils into map units including one or more dominant soil components and inclusions. Soil map unit components may be designated based on the soil series, slope, aspect and texture modifier. Soil series are soils grouped together with similar pedogenesis (soil formation), soil chemistry, and physical properties.

Three different map units have been identified in the treatment area consisting of the Hoxie and Oatman soil series (Table 10).

The Hoxie series consists of deep, poorly drained soils in basins with a typical pedon texture of silt loam and slopes 0 to 1%. Hoxie soils formed in lacustrine material with an influence of volcanic ash (Table 10). The Oatman series consists of deep, well drained soils in glacial deposits with a typical pedon texture of very gravelly medial loam and slopes 0-35%.

Table 10: Soil Types and characteristics of the Buck 13 treatment area

Map unit symbol	Map unit name	Slope (%) and aspect	Soil rutting hazard	Fire damage potential	
85 A	Hoxie Silt Loam	0-1%	Severe	Low	
136 E	Oatman cobbly loam	12-35%	Severe	Low	
137 C	Oatman cobbly loam, depressional	0-12%	Severe	Low	

Fire damage potential

Damage to organic matter increases as the duration of soil heating increases. Destruction of organic matter affects many physical and chemical soil properties including nitrogen and soil microorganisms in the litter and soil. Organic matter improves soil aggregation and structure by binding individual soil particles together and creating large pores which allow better water penetration and aeration. Organic matter provides exchange sites for cations. When organic matter is destroyed by fire, nutrients are released and become highly available for plant growth yet are often lost from the site by erosion or leached through the soil before they can be used. Intense fires would be expected to release larger quantities of plant nutrients from the litter and plants than those of low intensity (Christensen, 1973).

Soil heating during wildfires and prescribed burns may be similar for dry soil conditions, or when climatic conditions are conducive to rapid burning. When soil and litter are moist, less soil heating occurs. Organic matter in the soil, litter, or standing brush will ignite when heated to 427 degrees C (Gaylor, 1974).

The NRCS Fire Damage Potential rating was used to assess damage to nutrients, and physical and biotic soil characteristics by fire. The rating evaluates potential impacts of prescribed fires or wildfires intense enough to remove the duff layer and consume organic matter in the surface layer. The ratings are calculated based on the texture, content of rock fragments, and organic matter in the surface layer, thickness of the surface layer, and slope. “Low” ratings indicate fire damage is unlikely, little or no maintenance is needed, and soil physical and chemical properties are expected to remain in good condition. “Moderate” indicates fire damage may occur as one or more soil properties could become less than desirable (i.e. organic matter may be burned and essential nutrients become deficient or soil becomes hydrophobic). Soils with a moderate Fire Damage Potential rating will likely need some maintenance to decrease detrimental affects to soil physical and chemical properties. “High” indicates fire damage can occur as one or more soil properties could become less than desirable and mitigating detrimental affects to soil physical and chemical properties would require special design, extra maintenance, and costly alterations. Soil maintenance could include tilling, seeding, and erosion control measures.

Soil Erosion

The removal of the vegetative cover by fire greatly increases the flood peaks and erosion rates in mountain watersheds thereby increasing flood and erosion damage. Plant nutrients in the surface layer are removed as erosion occurs leaving a soil of low fertility. Loss of soil surface layers reduces soil water retention and limits vegetation growth. These conditions can alter the hydrologic characteristics of watersheds by tending to increase flood runoff and reduce sustained water yield (Sinclair, 1954).

Soil erosion potential was predicted using NRCS Erosion Hazard ratings and rates of erosion were calculated using the Forest Service Water Erosion Prediction Project (WEPP) model Fuel Management Erosion Analysis (FUME). Erosion Hazard ratings indicate the potential hazard of soil loss from off-road and off-trail areas when disturbance activities expose 50 to 75% of the soil surface. Erosion Hazard ratings are calculated with the soil erosion “K” factor and slope (USDA, NRCS).

A “slight” rating indicates erosion is unlikely under ordinary climatic conditions; “moderate” indicates some erosion is likely and erosion-control measures may be needed; “severe” indicates erosion is very likely and erosion-control measures are advised; and “very severe” indicates significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Ruts could form as a result of the operation of forestland equipment. Soils in the project area have been rated for Soil Rutting hazard based on depth to a water table, rock fragments on or below the surface, the Unified classification, depth to a restrictive layer, and slope. A rating of "slight" indicates that the soil is subject to little or no rutting, "moderate" indicates that rutting is likely, and "severe" indicates that ruts form readily.

Soil compaction

Soil compaction negatively affects physical and chemical properties thereby decreasing soil fertility. Compaction can increase bulk density and reduce plant root penetration, soil water holding capacity, and plant growth. Decreasing the soil pore space can decrease the size, reach, and extent of root systems. Destroying the soil structure can decrease water infiltration and increase runoff rates. As oxygen decreases in the soil, microbial respiration may be limited. Severe compaction may disrupt root metabolism and cause the soil to become anaerobic. Soils with a range of soil particle sizes (i.e. fine sandy loam) are generally more susceptible to compaction than soils with a more uniform particle size distribution. Generally, the risk of compaction tends to increase with increasing moisture content and the greatest sensitivity to compaction occurs at moisture contents near, but below, field capacity (O’Neill 2005).

Compaction is more likely to occur when bare ground is driven over. Studies on the west shore of the Lake Tahoe Basin in a mixed conifer forest showed no significant compaction occurred on coarse sandy loam soils when driven on with a Caterpillar 320C excavator with low-ground-pressure (37.9 kPa or 5.5 psi) triple cleat grousers (Hatchett, 2006). Other forest management practices using heavy metal tracked machinery has been found to cause detrimental levels of soil compaction. Studies have found thickly mulched litter layers may offset any increased erosion resulting from limited soil compaction.

Soils - Environmental Consequences

No Action

No thinning, burning, or timber harvesting would occur under the No Action Alternative. Soil disturbing treatments, such as slashbusting and underburning, could be implemented as described in other actions proposed in the Spencer Creek Fifth Field Watershed, however those activities are not proposed on these same soil map units. Soil amelioration of previous soil disturbances would continue to occur on old skid trails and landings in the project area. The No Action alternative could result in leaving these stands in a higher vulnerability to stand replacing wildfires. The subsequent soil effects from a stand replacing wildfire could result in a greater potential for surface erosion and reduction in soil productivity.

Proposed Action

Soil erosion

In areas with 50 to 75% of the surface exposed, such as on landings and skid trails, soils have a severe rutting hazard when wet. Soil rutting hazard ratings are high because soils in the project area are of low strength. If vegetation cover decreases below 85% following timber harvests, ruts could form and sediment could reach stream channels.

Roads are considered the principal cause of accelerated erosion in forests throughout western United States (Harr and Nichols 1993). Loss of soil productivity occurs when roads are compacted and established. A loss of soil occurs when concentrated water creates a gully or other erosional feature where soil particles (sediment) are washed from the road. Potentially, sediment could enter a watercourse after leaving a road. Roads throughout the project area are currently in good condition with minor amounts of sediment leaving the roads and entering stream channels.

Depending on amounts of use and precipitation, roads within the project area may continue to yield some amounts of sediment.

Nutrient, physical and biotic soil characteristics

Thinning decreases amounts of fuels and should decrease the likeliness of a wildfire burning large portions of the treatment area. Most likely, decreasing amounts of fuels would decrease effects of fire damaging the soils because surface temperatures would be less intense, and less of the duff layer and soil organic matter would be consumed. Burning slash piles could damage the soil depending on the intensity and duration of the burning, but if the burned area remains small and is interspersed throughout the units, erosion should be very minor. Soils within the treatment area have low Fire Damage Potential ratings indicating fire damage is unlikely and soil physical and chemical properties are expected to remain in good condition.

Soil compaction

Soils in the treatment area are either very friable (soil unit breaks upon very slight force between fingers) or friable (soil unit breaks upon slight force between fingers) indicating susceptibility to compaction. Timber harvesting with heavy machinery should operate when the soil is dry, and drive over material residue whenever possible to reduce soil compaction.

Mitigation

The Klamath Falls Resource Management Plans BMPs are designed to limit detrimental soil disturbance to less than 20% of the total acreage within an activity area (Page D-11 of the RMP). To minimize soil disturbance, common BMPs and PDFs required are:

- Use of existing designated skid trails, marked in advance for logging operators to confine soil disturbance.
- Seasonal restrictions to limit logging operations to the dry season to prevent compaction, puddling, and erosion.
- When reasonably feasible, allow operations when snow exceeds twenty (20) inches in depth.
- Leaving slash on the project area from manual treatments to reduce surface soil erosion and sedimentation.

Should conditions suitable for logging over frozen ground or snow occur (the snow pack persists and the area remains accessible), winter logging would be encouraged. Under winter logging, soil disturbance in treatment areas would be further minimized. Several timber sales have been completed on the KFRA where the sales were logged over 20 inches of snow. Implementation monitoring observations indicated almost no disturbance to the surface organic layer.

If implementation monitoring shows detrimental soil effects in excess of 20 percent of the total acreage within an activity area, the BMP guidelines (KFRA RMP, page D11) state that impacts would be mitigated with treatments such as ripping, backblading, or seeding.

Cumulative Effects – Both Alternatives

The cumulative effect on soil productivity results from a combination of various activities over a relatively short period of time. Natural mitigation occurs with freeze-thaw and accumulation of organic matter. In this project area, all the reasonably foreseeable projects are analyzed in this EA. Cumulative effects would occur from past practices, such as timber harvesting, fuels treatments, cattle grazing, road building and recreational use, if not mechanically or naturally mitigated, plus the effects from this project.

The proposed action would result in a reduced vulnerability to stand replacing wildfires and therefore reduced risk of soil impacts associated with stand replacing wildfires. However, the risk for a stand replacing wildfire remains minimal for either alternative since the analysis area is somewhat isolated and protected on the west side by relatively fire resistant pasture lands. In the short term, one to three years, the potential of soil compaction and potential runoff from the proposed skid trails would increase. The monitoring information collected to date, regarding the effectiveness of BMPs on minimizing soil compaction and disturbance (BLM APS 1999-2007) indicates that cumulative effects to soil resources would not exceed the RMP standards for detrimental soil conditions (ROD, page D-11). Treatments would continue to be implemented during the summer months (June-October) when soils are least susceptible to compaction. Snow logging would be allowed and encouraged when feasible. Logging on snow or frozen ground has been shown to reduce compaction to soils (Smith and Wass 1976, MeCleod 1998, Krzic 2004). Ongoing monitoring to measure soil compaction and recovery would assure that effects on soils are within the RMP standards and are mitigated by appropriate measures when needed.

Some projects have shown that subsequent work or on-the-ground activity becomes necessary if timber salvage is needed. While such actions are not anticipated at this time, it is possible that these increased impacts on soils could occur. If these types of actions are necessary, soils conditions would be evaluated and subsequent soil maintenance may be prescribed that could include tilling, seeding, and erosion control measures.

Roads - Affected Environment

According to a KFRA GIS analysis of BLM roads, there are approximately 362 miles of existing roads within the Spencer Creek Fifth Field Watershed. Approximately 200 miles of the roads are classified as open. The average road density on all ownership in the project area (Spencer Creek Fifth Field Watershed) is approximately 4.3 miles of road per square mile. On BLM lands the average road density is about 2.8 miles per square mile (BLM GIS analysis March 2008). The RMP objective is to reduce road density to 1.5 miles per square mile. The only road on BLM lands in section 13 is a natural surface road that currently is in use to access private lands. The 38-5E-12.0 Road provides access to private lands including summer housing and cattle handling structures. The access road crosses two private owners and lands administered by the US Forest Service before it reaches BLM lands. The road is generally closed during the winter by snow. The Nancy Charley Land Trust LLC has a Perpetual Right-of-Way Grant (No. OR59243FD) issued by the BLM to use the BLM portion of the road. The BLM has two non-exclusive easements to use the road where it crosses private lands to the north of the analysis area, one with the Nancy Charley Land Trust LLC and another with Wasser and Winters Company. The 38-5E-12.0 road crosses approximately 1/3 mile of riparian reserve on BLM lands. No public access is allowed on private portions of the access road and the private lands block access to the BLM portion of the road.

Roads - Environmental Consequences

No Action

Seasonal use of the 38-5E-12.0 Road by the adjacent private landowners would continue. No public access of the road is currently allowed and access would likely remain restricted. There would be no improvement of existing road surfaces or drainage features and no change to current low potential for input of sediment into adjacent Spencer Creek.

Proposed Action

There would be no net change in permanent road densities. No new road construction is proposed and only minor amounts of spot rocking and drainage maintenance are proposed for the approximately 1/4 mile of natural surface road on BLM lands. The road would remain available for seasonal access by the adjacent private land owners and closed to public access. The ID Team concluded that relocation of the main access road in order to move it out of the riparian reserve or building of a new road outside of the riparian reserves for timber harvest activities would create more detrimental impacts than continuing use of the existing road. Effects from the proposed action in regard to roads would not exceed those addressed in the RMP/FEIS.

Cumulative Effects – Both Alternatives

Cumulatively, there would be little difference between the two alternatives. There would be no net change in permanent or temporary road densities. The proposed action includes minor amounts of spot rocking for low lying wet spots and minor amounts of drainage work, primarily ditching. The rocking and drainage work could have minor, but not measurable, positive effects as far as reducing sediment transportation to Spencer Creek. Neither alternative would have any effect on the amounts of existing or open roads on the KFRA. The KFRA continues to strive to reduce open road density and environmental effects associated with roads during implementation of projects proposed in the foreseeable future. A combination of BLM and private checkerboard ownership and subsequent access agreements with adjacent landowners reduces BLM's flexibility in managing road densities in the proposed project area.

Hydrology - Affected Environment

The proposed timber sale is located in the Buck Lake 6th field sub-watershed in the Spencer Creek 5th field watershed on the southeastern portion of Buck Lake (Figure 3). Buck Lake contains a series of agricultural drainage canals and diversions. Spencer Creek is a perennial stream, confined to a canal on private land that flows along the East side of Buck Lake. Spencer Creek is a tributary to the Klamath River. Spencer Creek watershed is approximately 54,160 acres, 56 % of which is in federal ownership (16% BLM-administered). Under the Northwest Forest Plan, Spencer Creek is designated a Tier One Key Watershed due to its potential for conservation of at-risk fish species (KFRA RMP, page 8, 1995). The approximately 29 acres proposed for timber harvest activities accounts for 0.0005 percent of the total watershed. Field observations and survey mapping show that the main stem of Spencer Creek (diked and utilized as a drainage canal) is immediately adjacent to but outside of BLM ownership. One 20 foot long reach of Spencer Creek meanders into and out of BLM lands (outside of timber sale area) at the south end of the timber sale area boundaries. Spencer Creek, adjacent to the proposed timber sale, supports a variety of riparian sedges, rushes, and grasses, such as species of *Carex* and *Juncus*. Stream substrate within this portion of Spencer Creek is silt and sand dominated with some gravel (pea to tennis ball in size). The riparian area immediately adjacent to BLM lands, is used for agricultural purposes with upland grasses and exposed soil. However, the riparian reserve on the north and east side includes a small section of a second growth mixed conifer stand with interspersed large conifers, greater than 24 inches diameter at breast height. The Spencer Creek canal is bordered by pasture on the west side and 50 to 100 feet of pasture, grading into upland vegetation on the east (BLM) side. The upland vegetation consists mostly of conifers including lodgepole pine, white fir, Shasta red fir and ponderosa pine. Remnant aspen clones are also present in the riparian reserves. There is little ground vegetation under the conifers except occasional aspen sprouts. Most of the aspen present consists of older trees and dead trees.

Riparian reserves for Spencer Creek would be established on BLM lands following RMP guidelines (PDFs and BMPs, Appendix B). The proposed timber sale includes use of a native surface road within the riparian reserve.

Based on site observations (September 2006) within the proposed timber sale area, there are few trees providing shade to the stream, due primarily to the aspect of stream relative to Buck Lake which is open pasture land. The upland timber stand provides little shading to Spencer Creek (ditch) due to distance 50 to 100 feet and direction, east and north east of stream. The shade that is provided occurs early in the day before the sun is high in the sky.

Hydrology - Environmental Consequences

No Action

Although this alternative would result in no immediate timber harvesting, a combination of fuel treatments and road maintenance activities would likely occur in the proposed project area within the next ten years under other BLM actions. There would be no soil disturbance from ground-based logging equipment within this project area however numerous timber sales are proposed within other parts of the watershed. Within this project area vegetation that has become established on some existing roads and skid trails would not be disturbed by mechanized equipment and would continue to contribute to the capture and infiltration of water. Routine road maintenance (grading and spot rocking) would be expected to occur periodically and be designed to minimize effects on sediment inputs into stream channels.

The composition and character of forest stands adjacent to streams would not be altered. The risk of catastrophic wildfire would continue to gradually increase in overstocked stands, which could result in extensive mortality within riparian reserves and uplands if a wildfire was to occur. This could reduce the future supply of CWD and would result in reductions of stream shade. A stand replacing fire in this stand could trigger erosion and increase sediment inputs to Spencer Creek.

Riparian vegetation, particularly the declining aspen stands, would continue to be impacted by overcrowding and encroaching conifer trees.

Proposed Action

Potential effects on water resources resulting from proposed management activities would include compaction and erosion from ground-based logging equipment. Soil compaction can reduce water storage and capacity, decrease infiltration, and increase overland flow. Soil compaction and displacement can cause erosion and increase sediment inputs to stream channels. Areas especially susceptible to erosion are sites where slopes are 30% or greater, however the proposed project area is relatively flat with slopes ranging from 0 to 10%.

The KFRA ID Team analyzed two options for road use under the proposed action. The first option would build approximately 0.5 miles of new permanent road and two to three landings upslope and outside of the riparian reserve to accomplish logging/yarding of timber. The existing road would remain in place as it provides access to adjacent private land.

The second option would use the currently existing road (within the riparian reserve) and construct two to four landings to accomplish logging/yarding. The ID Team recommended the second option because the existing road currently provides access (easement) to an adjacent landowner and could not feasibly be removed. The ID Team also concluded that construction of 0.5 miles of new permanent road and additional landings (outside the riparian reserve) would cause more detrimental impacts than using the existing road. Due to the relatively flat slopes and adherence to BMPs and PDFs (Appendix B), negative effects from compaction and erosion are expected to be minimal.

Treatments in riparian reserves could have short-term adverse effects on existing vegetation in these areas. Existing vegetation aids in capture and infiltration of water which affects the release of this water in stream channels. Very little ground vegetation is present in the riparian reserve areas of the proposed timber sale due to shading provided by dense conifer stands.

Thinning and fuels reduction treatments in riparian reserves could have a beneficial effect on the amount, rate, timing, and duration of surface flow in the streams channels. Since the vegetation and soil conditions affect these attributes of water flow, treating riparian reserves would create more stable stand conditions, including improving resiliency of remaining trees. This would result in flows more similar to reference conditions. Treating overstocked stands could allow more water to flow down intermittent stream channels since there would be less transpiration from trees in the stand. By thinning the overstocked riparian reserves, site productivity could improve as more water is captured, stored, and released down stream channels and drainages.

The approximate five acres of aspen restoration treatments including removal of all but the largest conifers (24 inches dbh and larger), and subsequent underburning are designed to promote vigorous resprouting of decadent aspen clones. Underburning would increase exposed mineral soils and the potential for erosion and transportation of sediments to Spencer Creek. The relatively flat topography, zero to five percent, would limit erosion and sediment transportation. In addition,

these impacts are expected to be short term and would be reduced by adherence to the applicable BMPs and PDFs (Appendix B). The relocation of the livestock fence to the private property line would further promote retention of the new aspen sprouts and other riparian vegetation by excluding livestock grazing from this area. Vigorous aspen stands would help to stabilize that portion of the riparian reserve.

Use of existing roads and designated skid trails within the riparian reserves could remove most existing vegetation on the trails and roads. Vegetation would be affected by machinery passing over the routes, and surrounding vegetation could be affected by soil displacement from the roads and trails. This could cause a reduced amount of water capture and infiltration in the short-term. Adverse effects from loss of vegetation are likely to occur until the disturbed sites are re-vegetated. Applying PDFs, such as reseeded of roads and trails after project completion, would minimize adverse effects on the vegetation on the routes and to the immediate surrounding vegetation. The long-term positive effects on the vegetation community from regeneration harvests, density management and reduction of fuel loads would outweigh these short-term negative effects.

No new roads would be constructed in the analysis area. Some sediment could enter Spencer Creek as a result of soil disturbance on the 38-5E-12.0 Road located in the riparian reserves. Sediment could also enter Spencer Creek from proposed road maintenance and renovation activities and logging and hauling activities adjacent to the creek and within riparian reserves. Sediment entering the Spencer Creek could have a very short term negative effect on water quality, but following BMPs and PDFs would minimize sediment inputs, thus reducing probability of adverse effects.

Road improvements including spot rocking and drainage work could result in beneficial effects on water quality in Spencer Creek. These minor road treatments would aid in reducing sediment inputs from roads into Spencer Creek by improving water drainage off roads and reducing loss of sediments in low lying areas. In addition, since no new proposed road construction would occur in the analysis area, there would be low potential to adversely affect groundwater recharge and aquifer function due to additional road construction.

Based on the above analysis and review of the proposed action, proposed activities are consistent with the objectives for riparian reserves and the Aquatic Conservation Strategy (ACS) in the KFRA RMP and would not prevent or retard attainment of any of the nine ACS objectives (RMP, pages 7-8). The Proposed Action would:

- maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations, and communities are uniquely adapted.
- maintain the existing spatial and temporal connectivity of the watershed.
- maintain and restore the physical integrity of the aquatic system.
- maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems.
- maintain and restore the sediment regime under which this aquatic ecosystem evolved.
- have no effect on in-stream flows.
- maintain the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.
- maintain and restore species composition and structural diversity of plant communities in riparian areas and wetlands.
- maintain and restore habitat to support well distributed populations of native plant, invertebrate and vertebrate riparian dependant species.

Cumulative Effects

The analysis area considers the entire Spencer Creek 5th Field Watershed (Figure 3). The proposed project treatment areas comprise approximately .00005% of the watershed. Cumulative effects from the proposed action are expected to be minimal at the watershed scale because the analysis area comprises a very small percentage of the watershed. In addition, implementation of the BMPs and PDFs and the flat topography in the proposed timber sale area would limit cumulative effects.

Timber management in the last decade on BLM land has included approximately 1,710 acres of density management in the watershed. Stands throughout the Matrix allocation are expected to be selectively harvested (density management) approximately every 20-30 years or regeneration harvested if necessitated by stand conditions, according to Klamath Falls Resource Area plans. Current timber management on the surrounding private land is more intensive and occurs on a larger scale. This management regime is expected to continue in the future. The treatments proposed under the proposed action would aid in reducing the likelihood of a future catastrophic fire within the proposed project area. These management actions would be part of establishing more stable and resilient ecological conditions in the watershed.

No substantial change in hydrologically unrecovered status is expected at the watershed or sub-watershed scale from the proposed project in addition to other planned projects in the watershed. Recovery of previously logged stands is likely proceeding at a higher rate than planned activities that produce openings. Therefore, no changes in flow regimes due to changes in water yield are expected, including peak flow and base flow.

Since no new roads are proposed, there would be no incremental increase in negative cumulative effects from the current road network in the analysis area. There would be minor positive effects, however, from the proposed road improvements. Measurable cumulative effects from the proposed action are not expected at the watershed scale. The analysis area consists of a very small proportion of the watershed, and the timber management on BLM lands in the analysis area is minimal when compared with timber management on surrounding private lands. At the watershed scale, management on BLM and private lands would, to a minor extent, aid in reducing stand replacement fire events and improving ecological conditions.

Aquatic Wildlife Species – Affected Environment

Several fish and riparian obligate herptile species are known to occupy the present main stem of Spencer Creek (diked and utilized as a drainage canal) where it flows on private lands immediately adjacent to the proposed project area. No aquatic mollusks were documented during surveys by BLM biologists in 2007 (BLM EA-OR-014-05-07, Charley Trust Land Sale, 2007), therefore aquatic mollusks will not be discussed further in this assessment.

Fisheries

Spencer Creek supports a variety of native aquatic species. Spencer Creek is an important fish bearing tributary of the Klamath River, providing the majority of spawning habitat for Klamath redband trout (*Onchorhynchus mykiss*) residing in Klamath River between Keno Dam and the California/Oregon state line. Spencer Creek also provides important rearing and migratory habitat for redband trout. Klamath smallscale suckers (*Catostomus rimiculus*) use Spencer Creek for spawning, rearing, and migratory habitat. Klamath largescale suckers (*Catostomus snyderi*) may use the lower portion of the Spencer Creek for spawning and rearing. Other resident species

include lamprey species (*Lampetra* sp), Klamath speckled dace (*Rhinichthys osculus*), eastern brook trout (*Salvelinus fontinalis*), marbled sculpin (*Cottus klamathaensis*) and Tui chub (*Gila bicolor*).

Pacific giant salamanders (*Dicamptodon tenebrosus*) are known to reside in Spencer Creek. Spencer Creek is one of the eastern most streams occupied by this species. The Pacific giant salamander largely exhibits the aquatic form, maintaining gills into adulthood.

Spencer Creek contains two life history forms of redband trout—a resident form and a migratory form. Adult migratory forms migrate from the Klamath River in March through April to spawn and migrate back to the Klamath River in May. Migratory forms attain sizes up to 20+ inches. Juveniles of the migratory form generally rear in Spencer Creek for one year and migrate out to the Klamath River from March to July. Prior to dams blocking access in the early 20th century, anadromous forms of trout (*Onchorhynchus mykiss*) migrated to Spencer Creek to spawn and rear (Hamilton et al 2004). Resident forms are smaller and generally attain lengths of 8 to 10 inches. These fish spend their entire life cycle in Spencer Creek. Resident forms have been documented in Buck Lake and upstream of Buck Lake on Forest Service lands. It is unknown whether migratory forms routinely migrate as far upstream as Buck Lake. There is a relatively steep cascade ¼ mile below Buck Lake that may be a partial barrier to upstream fish migration when streamflow is low. The watershed assessment for Spencer Creek Watershed (USDI BLM 1995b) notes that the health of the aquatic ecosystem is impaired by changes in function due to management activities.

Three changes in habitat condition were determined to be chronic and problematic for native fish species in Spencer Creek; fine sediments, high water temperature, and low flows. The causes of a downward trend in habitat condition for Spencer Creek were attributed to high numbers of road crossings, past streamside timber harvest, and channelization and grazing in Buck Lake. The proposed timber sale is adjacent to a portion of Spencer Creek at the lower end of Buck Lake pasture. Due to channelization of the stream channel and intense grazing of the stream channel banks, Spencer Creek, where it is adjacent to the proposed timber sale, is in poor condition and currently provides low quality fish habitat. Field observation on April 3, 2007 indicated that there is little or no shade from streamside vegetation which could exacerbate the stream temperature problem. The channel substrate although dominated by gravel, is highly embedded with fine sediment. This condition diminishes the quality of the habitat for spawning and food production. There is the potential for fine sediment runoff from bare soil areas (including a corral in the sale area) adjacent to the stream. The condition of the stream channel in this area likely contributes to sediment and temperature problems in Spencer Creek.

Riparian obligate herptile species known to occur are those generally associated with permanent, intermittent and ephemeral water sources. These include Pacific chorus frog, long-toed salamander, and the western toad, western terrestrial garter snake and common garter snake.

The Klamath River is considered outside the area of effect for this proposal, so fish and other aquatic species that occur in the Klamath River are not considered in this analysis.

Aquatic Wildlife Species – Environmental Consequences

No Action

Limited ground disturbance and changes to vegetation resulting from fuel treatments and routine road maintenance would have minimal effect on aquatic species and habitats. Riparian reserves

and uplands would remain at risk for stand replacing wildfire and the resulting negative effects on aquatic species from erosion, higher than normal nutrient concentration, and sedimentation.

Proposed Action

Aquatic species and habitats in the timber sale planning area could be affected to the extent that hydrologic regimes of tributary streams are altered by ground disturbance and road use (see Hydrology section). If ground disturbances (compaction, vegetation removal, loss of duff/organic layer, and increased road use) act in combination to increase the magnitude of peak runoff events, negative effects on aquatic species from erosion, higher than normal nutrient concentration, and sedimentation would be expected. Aquatic species known to occur in the area are generally tolerant of intermittent and ephemeral water supplies, high water temperatures, and high sediment/nutrient supplies (BLM 1996). Implementing applicable PDFs and BMPs (Appendix B) is expected to mitigate effects on aquatic species to levels analyzed in the RMP and FEIS.

Cumulative Effects

Due to the limited aquatic habitat and lack of continuous connectivity in the project area, cumulative effects from either alternative would not be measurable at the project or watershed scale.

Livestock Grazing Management - Affected Environment

The proposed project area is within the Buck Lake Allotment which has an authorized grazing use of 175 AUMs from June 15 to September 15. The proposed project area was previously fenced and included as part of the adjacent private lands along Buck Lake. Cattle from the private lands had access to the proposed project area and frequently used the area for shade and forage. During 2007, a fence that was previously on BLM lands and allowed livestock access was moved to the private property/BLM boundary line. The proposed project area can currently only be accessed by livestock from BLM lands during the authorized season-of-use.

Livestock Grazing Management - Environmental Consequences

No Action

The No Action Alternative would provide a small amount of forage for livestock grazing within the area that has recently been added to the allotment through the fence relocation as noted in the Affected Environment section above. This would include approximately five acres within the aspen stand. The density of trees within the remaining project area would continue to limit the amount of available forage species in the understory.

Proposed Action

Fencing a portion of the proposed project to exclude livestock from the aspen restoration area would result in a minimal loss of livestock forage in the Buck Lake Allotment. The Buck Lake Allotment includes approximately 11,971 acres of BLM-administered lands and the total excluded area would be approximately five acres. The removal of the overstory trees from the remaining project area could result in a small increase in palatable understory forage species for livestock.

Cumulative Effects

Cumulative effects of the proposed action, in the short term (less than 2 years), include a slight decrease in available forage for livestock and wildlife due to ground disturbance from timber sale activities. The long-term cumulative effects of vegetation treatments would be to improve ecological condition and provide a slight increase in livestock forage species, especially in areas with little currently existing understory.

Cultural Resources - Affected Environment

Prehistorically (pre-1846), the project area is located within no distinct tribal territory. The area was used by the Takelma, Klamath, and Modoc tribes. Activity was limited to seasonal hunting and gathering. Permanent occupation sites, such as villages, were established at lower elevations. Later, in 1864, the area fell within the territory ceded to the United States by the Klamath Tribes. The Klamath Tribes consist of the Klamath, Modoc, and Yahooskin people. Although treaty rights are no longer federally recognized in the project area, the Klamath Tribes remain concerned about potential disturbance to cultural sites in the area.

Historically (post-1846), after the establishment of the Applegate Trail, the project area was used for cattle ranching and logging. O.J. Brown was the first to start a cattle ranch in the 1860s near the mouth of Spencer Creek. Logging began in the 1860s with a few small enterprising sawmills. The industry boomed in the early twentieth century both in and around the project area after the introduction of railroads nearby. Weyerhaeuser arrived in 1923 and began constructing logging roads. Today logging and ranching continue to be significant activities in the area.

Ed Vanderhelen bought land around Buck Lake in 1939 – 1940 to raise muskrats in Buck Lake. According to Hugh Charley (Ed Vanderhelen's grandson) a barn was built by his grandfather in the early 1940s. The muskrat business was short-lived and the lake was drained by Mr. Vanderhelen to accommodate livestock grazing in the mid-to-late 1940s. The barn and corrals (built after the late 1940s) were built adjacent to the former shoreline of Buck Lake. These structures were inadvertently placed on BLM property. An additional structure (a 2-story house/shed) was put on skids and moved from Forest Service property to BLM property (by mistake) in the 1970s. This trespass was discovered in the 1990s and since that time the BLM and the Charley Family Trust have been working on a settlement agreement where the land containing the trespass structures would be sold to the Charley Family Trust (see Nancy Charley Family Trust Direct Land Sale, EA No. OR014-05-07).

Additional information about cultural resources in the analysis area may be found in various overviews of the history and prehistory of the region (Beckham 2005, Follansbee and Pollack 1978, Mack 1991, and Spier 1930).

Cultural Resources - Environmental Consequences

No Action

Under the no action alternative, the one known archaeological site in the proposed treatment area would continue to be protected from ground disturbing activities.

Proposed Action

The entire proposed treatment area has been surveyed under two previous projects for cultural resources using BLM Class III survey methods. The first survey was conducted for the Buck Again Timber Sale by Sobel, Hann and Pizano in 1991. No cultural resources were found during this survey. The second survey was conducted by Kresl and Andrefsky with the Center for Northwest Anthropology, an affiliation with Washington State University in 1995. Kresl and Andrefsky found one isolated obsidian flake along the old Buck Lake shoreline. The adjacent Forest Service land was surveyed in 1994 by Budy for a Buck Lake Watershed Restoration project (FS Report #D3-173). The Buck Lake Ranch site (FS # 38-6-18-2H) was recorded during the 1995 survey. The ranch site area includes a barn and corral system built on BLM land called the Charley Family barn (BLM #FY05-014-001).

Apparently, the two surveys conducted on BLM land mistakenly believed that the barn and corral were on private property. Thus they did not record the features as historic. The Charley Family barn and associated corral system, has since been recorded on BLM in preparation for a potential land sale. During the land sale project the Charley Family barn and corral system was deemed not eligible for the National Register of Historic Places in accordance with 36 CFR Part 60.4 by the Oregon State Historic Preservation Office (SHPO). Although the Charley Family barn site is not eligible, it should still be protected through avoidance. Isolates are not protected under the law. Thus, no adverse effects to cultural resources are anticipated as a result of this alternative.

Cumulative Effects

Under the action alternative, the potential to encounter, or disturb, subsurface archaeological deposits appears limited based on regional survey results and the nature of disturbances anticipated. Protection measures (flagging and avoidance, buffers, and boundary adjustments) implemented for past actions have been effective in preventing effects on cultural resources and will continue to be used to avoid effects for current and future activities.

Recreation Resources - Affected Environment

The analysis area (Spencer Creek Fifth Field Watershed) provides opportunities for dispersed recreation such as hunting, fishing, mushroom picking, wood cutting, snowmobiling and other off-highway vehicle driving, dispersed camping, sightseeing and mountain biking. Nearby recreation facilities with some level of development include Surveyor campground and a network of forest roads. The actual Buck 13 Timber Sale area has very limited public access. The main access road is not open for public travel. No enhancements to public access are proposed under this timber sale. Any access to the timber sale area would require travel on foot over adjacent public lands.

The analysis area currently receives light dispersed recreation use most times of the year. No new recreation facilities are proposed within the analysis area.

For general information about recreation in the area, refer to the Klamath Falls RMP/ROD pages 47-53, and RMP maps 2-8 and 2-10.

Recreation Resources - Environmental Consequences

No Action

Opportunities to pursue recreation resources are expected to continue unchanged under this alternative. Public access would continue to require travel on foot over adjacent public lands.

Proposed Action

Since public access to the timber sale area is limited, little if any disruption to recreational users would occur during treatment activities. Short-term disturbances to recreationists from truck traffic, equipment noise, dust and smoke associated with treatment activities would be expected. A positive recreation benefit of treatment activities could occur through enhanced mushroom gathering opportunities.

The impacts associated with the proposed regeneration harvest, density management, fuels reduction and aspen restoration as described in the Proposed Action would not approach or exceed those described in the Klamath Falls Resource Area Final RMP (pages 4-104-108). No changes to public access are expected under the proposed action. The main access road would remain closed to the public and any access would be via foot travel through adjacent public lands.

See Appendix B for suggested PDFs and BMPs and mitigation related to recreation resources.

Cumulative Effects – Both Alternatives

Cumulative effects from either alternative are expected to be negligible due to the general lack of public access. One exception would be the event of a large scale wildfire which could negatively impact the dispersed recreation uses currently occurring, such as hunting.

Visual Resources - Affected Environment

The BLM has a basic stewardship responsibility to identify and protect scenic values on public lands. This is accomplished through the Visual Resource Management (VRM) program. Through this program, all BLM lands are inventoried and managed in specific VRM classes. BLM lands within the analysis area contain a variety of landforms and scenic/aesthetic qualities.

The analysis area is managed under BLM Visual Resources Management (VRM) Class IV guidelines.

Management objectives for VRM Class IV are to manage for maximum levels of change to the characteristic landscape. Management activities may dominate the view and be the major focus of viewer attention.

For additional information about scenic resources in the analysis area, refer to the Klamath Falls RMP/ROD pages 43-44, and RMP maps 2-5.

Visual Resources - Environmental Consequences

No Action

Current scenery would remain unchanged except for gradual changes as the stands age and additional trees die from insects and disease. No short term effects on visual resources would be expected, however there is a greater likelihood of widespread insect mortality and catastrophic fire, which could greatly affect long term scenic resources.

Proposed Action

Proposed treatment activities would have minimal negative effects on visual resources. Maintaining overstory and multi-strata stand structure and reducing competition and stress to reserve trees, would reduce the to impact visual resources.

Long-term management of visual resources within the analysis area would likely be positively affected by proposed harvest treatments, aspen restoration, and follow-up prescribed fire activities. These treatments would greatly reduce the opportunity for catastrophic wildfire and increased insect mortality due to drought and overstocked stands within the treated areas.

Some additional PDFs and BMPs (Appendix B) have been proposed to reduce the visual effect of harvesting within 1/4 mile of existing rural housing. The proposed regeneration harvest is not near major roads.

Cumulative Effects – Both Alternatives

Cumulative effects from either alternative are expected to be negligible, except in the event of a large scale wildfire.

Socioeconomics – Affected Environment

The proposed action lies within an area that is used by a variety of the public for recreation, hunting, fishing, mushroom gathering, as well as other uses. The proposed project area has provided a sustained supply of timber for processing in the surrounding communities including; Klamath Falls, Yreka, and Medford. Some timber has been hauled as far as Redding or Glide for processing. For every million board feet of timber harvested and processed in Oregon, approximately ten jobs are generated, eight in the lumber and plywood industry and two in the logging industry (Charnley, S., ed. – In press].

In addition to the timber value, the Klamath County Economic Development Association (KCEDA) has recently completed a biomass study to determine the feasibility of constructing a small sawlog mill and wood residue biomass plant in Klamath County (Continental Resource Solutions, Inc. 2004). The objectives would be to increase the utilization of smaller diameter material and logging residue typically burned in the forest. Additional benefits as indicated in the study would be employment opportunities within the county associated with biomass utilization as well as hazardous fuel reduction on forest lands. The proposed project would make available for utilization biomass material that typically is not processed for lumber or veneer. This could result in additional employment.

The Oregon and California Railroad and Coos Bay Wagon Road Grant Lands Act (O&C Act) (43 U.S.C. § 1181a, et seq.) provides the legal authority for the management of O&C lands by the Secretary of the Interior. The O&C Act requires that the O&C lands be managed “...*for permanent forest production, and the timber thereon shall be sold, cut, and removed in conformity with the principal of sustained yield for the purpose of providing a permanent source of timber supply, protecting watersheds, regulating stream flow, and contributing to the economic stability of local communities and industries, providing recreational facilities...*”

Socioeconomics – Environmental Consequences

No Action

The No Action alternative would affect local businesses primarily dependent upon forest products. Based upon the assumption above that for every 1 million feet of timber harvested, ten jobs are generated, approximately five jobs either locally or within the community that processes the timber could be impacted. The No Action alternative should not result in any detectable socioeconomic change in regards to recreational uses. Hunting, fishing, and other recreational uses are expected to continue at the present level regardless of implementation of the No Action or Proposed Action.

Proposed Action

The proposed action would remove approximately 0.5 million board feet of timber (.5 MMBF) and result in approximately five related jobs. The local area processes a considerable amount of timber and the proposed action is only a small percentage what is processed annually. The RMP states that the annual sale quantity for the Klamath Falls Resource Area from Matrix lands is approximately six million board feet (6 MMBF). Processing facilities are dependent upon a stable, sustainable, and reliable supply of timber. Continual litigation of timber sales on federal lands has decreased the stability of a sustainable supply. The cumulative effects of this instability are closures of processing facilities and the corresponding loss of jobs. Although private timberlands supply much of the present demand for timber, some of the present forest industrial infrastructure is dependent upon a sustainable supply of timber from federal lands.

The proposed action helps meet the objectives of the O & C act by providing "...a permanent source of timber supply" and to contributes, "to the economic stability of local communities and industries, ...".

CHAPTER 4 – CONSULTATION

Endangered Species Act Consultation

Consultation with the U.S Fish and Wildlife Service (FWS) was completed for species listed under the Endangered Species Act that may be affected by the proposed action. This consultation included three proposed timber sales in the Spencer Creek watershed including the Buck 13 proposed action. The BLM determined that the proposed actions "May Affect Likely to Adversely Affect" the northern spotted owl due to the removal of suitable spotted owl habitat. No Critical Habitat occurs within the project area. No spotted owls occur within the proposed action and the timber harvest area does not fall within the home range of a spotted owl nest territory therefore no incidental take would occur from the proposed action. The FWS concurred (BO 1-10-08-F-07/0082) with the BLM on this determination.

CHAPTER 5 – LIST OF PREPARERS

Shane Durant	Author/Forester
Steve Hayner	Wildlife Biologist, Special Status Animal Species
Brooke Brown & Michelle Durant	Archaeologists
Eric Johnson	Fire Management Specialist
Don Hoffheins	Planner, Soil Scientist
Madeline Campbell	Silviculturist
Dana Eckard	Range Conservationist
Kathy Lindsey	Writer-Editor
Andy Hamilton	Hydrologist
James Ross & Rob Roninger	Fish Biologists
Brian McCarty	Engineer
Scott Senter	Recreation & Visual Resources
Molly Boyter	Botanist - Noxious Weeds, Special Status Plant Species
Nikos Hunner	Soil Scientist

APPENDIX A – BIBLIOGRAPHY

Agee, J.K., 1993. Fire Ecology of Pacific Northwest Forest. Island Press, Washington, D.C., 493 pages.

Arnett, E.B., R.J. Anderson, C. Sokol, F.B. Isaacs, R.G. Anthony, and W.P. Erickson, 2001. Relationships Between Nesting Bald Eagles and Selective Logging in South-central Oregon. Wildlife Society Bulletin 29:769-778.

Atzet, Thomas and L.A. McCrimmon, 1990. Preliminary Plant Associations of the Southern Oregon Cascade Mountain Province. USDA Forest Service Pacific Northwest Region, Siskiyou National Forest.

Beckham, Stephen Dow, 2005. Upper Klamath River Canyon of Oregon and California: Historical Landscape Study. Manuscript on file at Bureau of Land Management, Klamath Falls Resource Area, Klamath Falls, Oregon.

Bureau of Land Management (BLM), 1991. Final Environmental Impact Statement, Vegetation Treatment on BLM Lands in Thirteen Western States.

Bureau of Land Management (BLM), September 1994. Final KFRA Resource Management Plan and EIS (RMP FEIS). Klamath Falls Resource Area, Klamath Falls, Oregon.

Bureau of Land Management (BLM), June 2, 1995. KFRA Resource Management Plan (RMP) Record of Decision (ROD) or (KFRA RMP/ROD). Klamath Falls Resource Area, Klamath Falls, Oregon.

Bureau of Land Management (BLM), July 21, 1993. KFRA Integrated Weed Control Plan EA (# OR-014-94-09). Klamath Falls Resource Area, Klamath Falls, Oregon.

Bureau of Land Management (BLM), June 10, 1994. KFRA Fire Management EA (# OR-014-94-09). Klamath Falls Resource Area, Klamath Falls, Oregon.

Bureau of Land Management (BLM), June 24, 1996. Topsy/Pokegama Landscape Analysis. Klamath Falls Resource Area, Klamath Falls, Oregon.

Bureau of Land Management/U.S. Forest Service (BLM/USFS), March 2004. Record of Decision, To Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines.

Charnley, S., ed. [In press]. Northwest Forest Plan: the first ten years. Rural communities and economics. Gen. Tech. Rep. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Continental Resource Solutions, Inc., 2004. Biomass Feed Stock Assessment Site Identification Environmental and Financial Feasibility Study Critical Flaw Analysis. Klamath County Economic Development Association, Klamath County, Oregon.

Christensen, Norman L. 1973. Effects of fire on factors controlling plant growth in *Adenostoma* Chaparral. *Ecol. Monogr.* 54(1):29-55

Cross, Stephen P. and Anthony E. Kerwin 1995. Unpublished Report. Survey of Bats and Their Habitats in the Winema National Forest and the lakeview District BLM (Klamath Falls Resource Area) in 1994. Dept. of Biology . Southern Oregon State College. Ashland, OR.

DeBano, L.F., Folliott, P.F., Baker, M.B. Jr, 1996. Fire severity effects on water resources, in Proceedings of a Symposium held March 11-15, 1996, Tucson, Arizona. U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO, p. 77-84.

Follansbee, Julia A. and Nancy L. Pollock, 1978. Prehistory and History of the Jackson-Klamath Planning Unit: A Cultural Resources Overview. Manuscript on file at the Klamath Falls Resource Area, Bureau of Land Management.

Gaylor, Harry P “Wildfires-prevention and control”, Prentice-Hall Co., 1974. Bowie, Maryland.

Harr, R. D., 1976. Hydrology of small forest streams in western Oregon. USDA Forest Service Gen. Tech. Rep. PNW-GTR-55. 15 pages.

Hatchett, B. et al. “Mechanical mastication thins Lake Tahoe forest with few adverse impacts”, *California Agriculture*, 2006. 60:2

Hopkins, William E. 1979. Plant Associations of South Chiloquin and Klamath Ranger Districts – Winema National Forest. USDA Forest Service, Pacific Northwest Region, R6-Ecol-79-005.

Krzic, M., H. Page, R.F. Newman, and K. Broersma. 2004. Aspen regeneration, forage production, and soil compaction on harvested and grazed boreal aspen stands. *BC Journal of Ecosystems and Management* 5(2):30–38. URL: www.forrex.org/jem/2004/vol5/no2/art4.pdf

Mack, Joanne M., 1991. Upper Klamath River Canyon Prehistory. In *Klamath River Canyon Prehistory and Ethnology*, edited by Richard C. Hanes, pp. 1 – 110. Bureau of Land Management, Cultural Resource Series No. 8.

McLeod, A.J. 1988. A pilot study of soil compaction on skid trails and landings in the Prince George Forest Region. In *Degradation of forested lands: Forest soils at risk. Proceedings, 10th B.C. Soil Science Workshop, February 1986.* J.D. Lousier and G. Still (editors). B.C. Ministry of Forests, Victoria, B.C. Land Management Report No. 56.

O’Neill, K. P. et al., “Soil as an Indicator of Forest Health: A Guide to the Collection, Analysis, and Interpretation of Soil Indicator Data in the Forest Inventory and Analysis Program” 2005. Gen. Tech. Rep. NC-258. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station.

Sinclair, J.D. “Erosion in the San Gabriel Mountains of California. *Transactions of American Geophysical Union*” 1954. 5(2): 264-268

Smith, R.B. and E.F. Wass. 1976. Soil disturbance, vegetative cover and regeneration in clearcuts in the Nelson Forest District, British Columbia. Canadian Forest Service, Pacific Forest Research Centre, Victoria, B.C. BC-X-151.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at <http://websoilsurvey.nrcs.usda.gov/> accessed [month/day/year].

Spier, Leslie, 1930. Klamath Ethnography. University of California Publications in American Archaeology and Ethnology, Volume 30, University of California Press, Berkeley, California.

Altman B. 2000. Conservation Strategy for Landbirds of the East-Slope of the Cascade Mountains of Oregon and Washington. Partners in Flight. Corvallis, OR.

BLM APS 1999, 2002. Bureau of Land Management (BLM), 1999-2004. Annual Program Summary and Monitoring Reports (1999, 2002). Klamath Falls Resource Area, Klamath Falls, Oregon.

BLM 1995. Bureau of Land Management (BLM), August, 1995. Spencer Creek Pilot Watershed Analysis. Klamath Falls Resource Area, Klamath Falls, Oregon.

Bull , E.L., A.L. Wright and M.G.Henjum. 1990. Nesting habitat of Flammulated Owls in Oregon. Journal of Raptor Research. 24:52-55.(as cited in Marshall et al 2003).

Cross, Stephen P. and Anthony E. Kerwin 1995. Unpublished Report. Survey of Bats and Their Habitats in the Winema National Forest and the lakeview District BLM (Klamath Falls Resource Area) in 1994. Dept. of Biology . Southern Oregon State College. Ashland, OR.

Marshall, D.B., M.G. Hunter, and A. L. Contreras (eds.). 2003. Birds of Oregon – A general reference. Oregon State University Press, Corvallis, Oregon.

ODFW 2006. Personal Communication with ODFW biologists on detection of Pacific Fisher. Klamath Falls, Oregon.

USDA USDI 1994. U.S. Department of Agriculture, Forest Service; U.S. Department of Interior, Bureau of Land Management, 1994. Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl. Portland, OR.

USDI 2002, Fish and Wildlife Service (FWS), 2002. “Birds of Conservation Concern 2002”. U.S. Fish and Wildlife Service, Portland, OR.

USDI 2007, U.S. Fish and Wildlife Service 2007. 2007 Draft Recovery Plan for the Northern Spotted Owl. Region 1. Portland, OR.

USDA USDI 2001. U.S. Department of Agriculture-Forest Service and U.S. Department of Interior-Bureau of Land Management (USFS and BLM). 2001. Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines in Forest Service and Bureau of Land Management Planning Documents within the range of the Northern Spotted Owl.

USDA/USDI. U.S. Department of Agriculture-Forest Service and U.S. Department of Interior-Bureau of Land Management (USFS and BLM) 2004. Survey Protocol for the Great Gray Owl within the Range of the Northwest Forest Plan. Version 3.0

USDA/USDI U.S. Department of Agriculture-Forest Service and U.S. Department of Interior-Bureau of Land Management (USFS and BLM). 2007 Record of Decision *To Remove the Survey and Manage Mitigation Measure Standards and Guidelines from Bureau of Land Management Resource Management Plans Within the Range of the Northern Spotted Owl*. Portland, OR.

Weller, T.J., and C.J. Zabel. 2001. Characteristics of fringed myotis day roosts in northern California. *Journal of Wildlife Management* 65:489-497.

APPENDIX B – SUMMARY OF BEST MANAGEMENT PRACTICES AND PROJECT DESIGN FEATURES

Appendix D of the RMP (pages D1-D46) describes the Best Management Practices (BMP) that are “designed to achieve the objectives of maintaining or improving water quality and soil productivity and the protection of riparian-wetland areas”. Best management practices are defined as methods, measures, or practices selected on the basis of site-specific conditions to ensure that water quality will be maintained at its highest practicable level (D-1, Appendix D, RMP). In addition to BMPs that focus on water quality and soil production, the interdisciplinary team also develops Project Design Features (PDF) with the objective of meeting other resource goals. For instance, the PDFs listed below under Wildlife and Vegetation are designed to meet resource objectives associated with these resources and not necessarily water quality. In addition, the PDFs listed under Recreation and Visual are designed to meet objectives stated in the RMP for these respective resources. The list below is not an exclusive list of BMPs or PDFs for the Buck 13 Timber Sale. It is a list of the BMPs and PDFs that the interdisciplinary team found to be most pertinent for the proposed action. All of Appendix D as well as the Annual Program Monitoring Reports are used when developing the final operational specifications for a treatment.

Upland Forest Vegetation - Harvest Prescription

Regeneration Harvests

- Regeneration Harvests will occur on approximately 15 acres of the 29 total proposed harvest acres.
- Retain at least 16 to 25 large green trees per acre in regeneration harvest units (RMP – Plan Maintenance FY 1999 – page 23).
- Regeneration harvests would not be programmed for stands under 120 years of age and generally would not be programmed for stands under 150 years of age within the next decade unless required by deteriorating stand condition, disease, or other factors that threaten the integrity of the stand. Priority for harvest in stands under 150 years of age would be commercial thinning (Page E-10 of the RMP).
- Regeneration strategies would be planned to produce the highest probability of success at the lowest practical cost and will include provisions for species diversity and long-term site productivity within the design. Practices will be strongly influenced by consideration of ecological site potential, for retention of sufficient canopy to assure control of competing vegetation, by the requirements of owl habitat connectivity at the stand level, and by factors including growing season frost potential (Page E-10 of the RMP).
- Generally, Regeneration Harvests would be used when:
 - Mortality exceeds 40 percent of the canopy
 - Dead and dying trees are producing excessive fuel loads and increasing fire risks.
 - Regeneration of preferred species (pines and Douglas-fir) is necessary.
 - Large disease pockets are preventing the re-establishment of habitat.
 - To meet visual resource management objectives.

Density Management Harvests

- For uneven-aged stands, maintain a multi-strata stand structure.
- Thin around large mature trees to improve vigor and reduce hazardous fuels risk.
- For stands with a basal area over 200 square feet per acre, thin to an average of 120 square feet per acre
- For stands with a basal area less than 200 square feet per acre, thin to an average of 90 square feet per acre.

- Generally retain the most dominant or co-dominant tree that is full crowned, vigorous, and disease free.
- Species selection priority: Sugar pine (highest), Douglas-fir, Ponderosa pine, Incense cedar, White fir (lowest).
- Retain (no thinning) isolated thermal clumps to provide variability in spacing and structure.

Patch Cuts

No Patch Cuts are proposed in the treatment area.

Roads

- The BMPs listed in Appendix D of the RMP provide standard management practices that are to be implemented.
- Seasonally restricting renovation activities is recommended to eliminate sediment transportation to streams.
- Installing drainage dips in accordance with RMP BMPs to reduce surface and ditchline runoff is recommended.
- Apply mulch and seeding or other methods of soil stabilization to any exposed soil surfaces prior to the wet season to reduce surface erosion.
- Direction from the RMP ROD for Key Watersheds includes reducing road mileage and a no net increase in road mileage. Minimal or no grading of the existing roads will be done to maintain the existing ground cover and vegetation and to decrease sediment movement.

Soil Resources

- Limit detrimental soil conditions to less than 20 percent of the total acreage within the activity area. Use current soil quality indicators to monitor soil impacts. Sites where the 20 percent standard is exceeded will require treatment, such as ripping, backblading or seeding.
- To protect riparian areas, soil resources, and water quality while limiting erosion and sedimentation to nearby streams and drainages, do not allow logging operations during the wet season (October 15 to May 1, exception for snow logging conditions).
- Limit mechanical cutting and yarding operations to periods when the soil moisture is below 20 percent at a six inch depth. Even lower soil moisture levels are preferable on fragile soils.
- Permit logging activities during this time period if frozen ground or sufficient snow is present. This is normally when snow depths are in excess of twenty (20) inches in depth.
- To protect soil resources and water quality, close unsurfaced roads during the wet season (October 30 to June 1) unless waived by authorized personnel.
- Residual slash will be placed upon skid trails upon completion of yarding.
- Avoid placement of skid trails in areas with potential to collect and divert surface runoff, such as the bottom of draws and ephemeral drainages.
- Retain and establish adequate vegetative cover in accordance with RMP BMP's to reduce erosion.
- Retain enough small woody (dead and down) material to sustain soil nutrients. See RMP BMP's for specifications. In ponderosa pine forest land, 9 tons per acre of duff and litter (approximately ½ inch deep).
- Seed and/or mulch exposed and disturbed soil surfaces with native seed when seed is available.
- Cable yarding and restricted use of mechanized equipment is required on slopes that are greater than 35 percent.
- Construct fireline by hand on slopes greater than 35 percent.
- Hand pile and burn within 100 feet of Riparian Reserves.

Hydrology & Riparian Reserve Treatments

Timber Harvest

Delineate Riparian Reserve widths as described in the RMP (pg F-8, ROD pgs C-30 to 31) (see Table B-1 below)

Table B-1: Riparian Reserve Widths

Riparian reserve type	Reserve width
Fish Bearing Streams	At a minimum, the reserve will include: The stream channel and the area extending to the top of the inner gorge; The wetland and the area extending to the outer edges of riparian vegetation; The area extending from the stream channel to a distance equal to the height of two site potential trees* (160 feet) The extent of stable or potentially unstable areas.
*A site-potential tree is defined as the average maximum height of the tallest dominant trees (200 years old or more) for a given site class. In the Buck 13 Timber Sale project area, the site potential tree height was determined to be 160 feet.	

- For understory vegetation treatments within older, multi-age stands within Riparian Reserves, delineate “no-cut” buffers along stream channels and wetland areas. No-cut widths would be 20 foot on each side of non-fish bearing stream channels and wetlands.
- Existing landings and roads within riparian reserves would be used only if replacing them with landings and roads outside the riparian reserves would result in greater overall disturbance to the riparian reserve or water quality.
- Avoid placement of skid trails and landings in areas with potential to collect and divert surface runoff such as the bottom of draws and ephemeral drainages.
- Harvest/treatments methods that would disturb the least amount of soil and vegetation (yarding over snow or frozen ground, limiting activities to the dry season, pulling line to each tree, and minimizing skid trails) would be used in the Riparian Reserves.
- Consider retaining some downed logs for instream structural enhancement projects.
- No new permanent roads will be constructed within Riparian Reserves (except where construction or re-alignment of short road segments allows obliteration of longer road segments within Riparian Reserves).
- Yarding/skidding corridors that pass through Riparian Reserves will be designated prior to project implementation, will have a minimum spacing of 150 feet and be oriented perpendicular to streams, will have minimal relative slope, and will be revegetated following project implementation (as needed).
- Use of existing roads and landings within Riparian Reserves will be reviewed and approved by the Klamath Falls Resource Area interdisciplinary team.
- Mechanical treatments would be allowed in aspen stands only during periods when detrimental soil effects would be least likely to occur.

Fuels Reduction (Post-harvest)

Mechanical fuels treatments in riparian reserves:

Treatments methods that would disturb the least amount of soil (yarding over snow or frozen ground, limiting activities to the dry season, pulling line to each tree, and minimizing skid trails) would be used in the Riparian Reserves.

Ignitions within riparian reserves:

- In general terms, ignition of broadcast fires should not occur within a minimum of 50 feet from the stream channel within the riparian reserves. The specific distance for lighting fires within the RR will depend on topography, habitat, ignition methods, fuel moisture and fire objectives (aspen restoration).
- Ignition line location nearest the stream should be based on topography and ignition methods and should be sufficient to protect water quality, CWD, and stream overhead cover. If it's wet don't pour fuel on it. If CWD directly touches the high water mark of the stream, or the CWD may be affected by high flows, don't ignite it. If there is a thick vegetation cover that extends out from the stream to the line of ignition then move the line of ignition into the forest stand, away from the stream.
- Recommend the ignition line location near large open meadows, associated with the stream channels, be located at the toe of the slope above the meadow elevation as much as possible in order to protect meadow vegetation.
- When igniting fuels on the lower end of the window of moisture content, increased ignition spacing from stream would be recommended to further protect CWD and overhead cover components.

Roads and temporary fire trail access in riparian reserves:

Use of existing roads and landings within the RR will be reviewed and approved by the KFRA ID Team.

Streamside pumping sites:

- Pumping on small streams should not reduce the downstream flow of the stream by more than half the flow.
- If possible avoid the construction of temporary pump chances, when necessary use temporary plastic dams to create chances and remove these dams when not actively pumping.
- Recommend that pump intake be suspended near the thalweg (deepest/highest quantity of flow) of the stream. Avoid placing pump intakes on the substrate or edges of the stream channel.

Post-fuels treatments for access roads and temporary fire trails:

- Installing drainage dips, or water bars, in accordance with RMP BMPs to reduce surface runoff is recommended.
- Mulch and seeding or other methods of soil stabilization are to be applied to any exposed soil surfaces prior to the wet season to reduce surface erosion.
- Design blockages (close or decommission) upon completion of treatments to minimize non-authorized use of roads and skid trails within treatment areas.
- Recommend placement of residual slash on trails upon completion of mechanical treatments.

Wildlife Terrestrial Species

Snag Retention

Approximately 2.4 snags per acre will be retained with a minimum diameter at breast height (DBH) of 16", or largest available if less than 16" (RMP/ROD, Page 26-27).

Coarse Woody Debris (CWD)

Approximately one hundred and twenty (120) linear feet of down logs per acre will be retained. Logs shall be greater than or equal to sixteen (16) inches in diameter and sixteen (16) feet long (RMP/ROD, Page 22).

Seasonal Restrictions

Seasonal restrictions will be required where the following wildlife species are actively nesting: bald eagle, northern spotted owl, northern goshawk, osprey, and special status species. Seasonal restrictions for specific species can be found on pages 231-240 of the KFRA FEIS.

Nesting Areas

Protect nesting areas as describe on page 38 of KFRA RMP.

For Fuel Treatment Units Adjacent To Or Containing Bald Eagle Nest Sites:

- No treatments will be planned within the core area (as identified by the BLM wildlife biologist) of a bald eagle nest site during the nest season. Nesting season is considered January 1st – August 15th. The wildlife biologist may adjust these dates if the young have fledged prior to Aug. 15th (usually the fledging date plus 2 weeks). The core area will consist of the withdrawn area around the nest and the disturbance area around the nest. Generally the disturbance area is considered ¼-mile or ½ mile line-of sight. This distance may vary depending on topography and site-specific information.
- Smoke management will be planned in such a way to avoid adverse effects of residual smoke on nest sites adjacent to burn units.
- A BLM wildlife biologist will be consulted about eagle use of the area before the fuel treatments are initiated to ensure the eagle situation is closely monitored.
- A biologist/designee will monitor the nest area during the burns to ensure that objectives and PDF's are met (smoke management, fire intensity, etc).
- In areas where prescribed fire activities are being planned, remove the brush, ladder fuels and large down woody debris within the dripline (approximately 30+ ft.) of the eagle nest trees and potential or identified perch/roost trees to reduce ladder fuel. The brush would be piled away from the nest and burned.
- So fire activity will be reduced immediately adjacent to the nest trees during the broadcast burning of the area, personnel will be required to complete one or more of the following:
- Pull back of 10 and 100 hour fuels 30' from the base of the nest trees/ perch trees.
- Construct fire line around the nest trees/perch trees.
- Use foam, water, or other retardants to protect the nest tree (unless in a riparian zone).
- Ladder fuels would be removed from the dripline (30ft.)
- If the nest is occupied or spring burning is preferred because of excess fuel loading or to meet other resource objectives, then spring burning will not be allowed until site-specific discussions/consultations are completed with USFWS on this matter.
- Aircraft used during prescribed fire operations would maintain a buffer >1/2 mile distance from the nest during the nesting season (this distance may vary if topographical features allow). No buffer would be necessary outside the nesting season.
- In instances when verifying nesting status is necessary prior to activities taking place, survey protocols used by Oregon Eagle Foundation annual bald eagle survey flights would be followed.
- Fuel treatments can proceed in the core area, if no nesting has occurred by May 6 (last date documented for initiation of incubation, Frank Isaacs, personal communication)

For units adjacent to or containing spotted owls or NRF habitat:

- Burn prescriptions will require proper fuel moisture and atmospheric conditions so adequate large woody debris will be retained for prey habitat.
- General objective for burn would be to create a mosaic of burned and unburned habitat in the unit to maintain some habitat for prey production.
- In NRF habitat maintain visual screening along open roadways to minimize disturbance. In northern spotted owl NRF habitat, maintain the understory structure by retaining a diversity of the sub-merchantable understory conifer trees (Douglas -fir, white-fir, sugar pine, cedar, ponderosa pine). In mechanical treatment areas this would be done by site-specific designs described in the individual task orders. During prescribed fire activities the overall objective is to create a mosaic of burned and unburned areas. Ignition techniques and pull back on smaller trees may also be used to maintain the understory structure.
- Retain untreated areas ranging from ¼ acre to five acres (thermal clumps) within the treatment units to provide diversity for wildlife.
- During prescribed fire activities create a mosaic of burned and unburned areas to maintain a diversity of species and age classes of understory vegetation.
- Maintain habitat connectivity and corridors.

Noxious Weeds

- Require cleaning of all equipment and vehicles prior to moving on-site to prevent spread of noxious weeds. Also, if the job site includes a noxious weed infestation, require cleaning of all logging and construction equipment and vehicles prior to leaving the job site. Removal of all dirt, grease, and plant parts that may carry noxious weed seeds or vegetative parts could be accomplished by using a pressure hose to clean the equipment.
- Conduct monitoring activities related to proposed treatments as described in the Klamath Falls ROD

Special Status Species

Provide snag mitigation measures for White-headed Woodpecker, Black-backed Woodpecker, Pygmy Nuthatch, and Flammulated Owl. Increase snag retention requirements from 1.9 to 2.5 snags per acre.

Cultural Resources

- Follow procedures for cultural protection and management outlined in the KFRA ROD/RMP (page 43), and protect identified sites by buffering.
- In accordance with guidelines and directives in the Klamath Falls Resource Area RMP, BLM regulations, and the National Historic Preservation Act, areas not included in previous archaeological surveys will be surveyed before any ground-disturbing action is undertaken.

Visual Resources

- The proposed regeneration harvest is not in the VRM class II area, or near major roads. However to reduce visual impacts within ¼ mile of rural housing, the regeneration harvest area should be designed with irregular shapes and avoiding linear lines, to mimic any nearby natural openings.
- Where possible, maintain visual screening along roadways.
- Minimize number of skid trails and amount of ground disturbance
- Minimize damage to residual trees through careful timber falling.

- All treatments will meet appropriate Visual Class objectives specified in the KFRA ROD/RMP (page 44).

Recreation Resources

- Coordination between snowmobile operations and winter time harvesting operations will be done annually.
- In addition, the haul route shall be signed to caution users that log truck traffic is occurring along the road.
- During any winter harvesting operations, all subcontractors working in the Contract Area shall be advised of snowmobile traffic.

APPENDIX C – SILVICULTURAL PRESCRIPTION BUCK 13

Buck 13 Timber Sale (approximately 30 acres)
T. 38 S., R. 5 E., Section 13, W.M.

Matrix LUA (approximately 15 acres)

- Regeneration harvest, orange leave tree mark
- favor ponderosa pine, sugar pine, white pine and Douglas-fir for leave trees, leave clumps OK especially with smaller leave trees
- cut some green culls to reduce stocking and fuels
- mark orange (to leave) most desirable snags and CWD, keep a variety of decay classes
- orange mark to reserve, any healthy DF, PP, WP, SP and IC understory trees
- gross yard excess CWD to landings
- remaining slash concentrations: slash bust or pile slash; follow-up with cool prescribed burn
- plant mix of ponderosa pine, Douglas-fir and if available, rust resistant white pine
- plant after underburning or avoid underburning for 30 years or until planted trees can withstand cool burns
- reserve all snags except hazard trees

Riparian Reserve LUA, between the 38-5E-12.0 Road and Matrix LUA (approximately nine acres)

- Density management thin and doughnut cut around large pines, green cut tree mark
- culture around large pines (20 inches dbh and larger)
- cut all competing true fir trees, dripline + 20 feet or 30 foot radius, whichever is greater
- density management, thin to 120 to 160+ square feet of basal area
- leave more trees towards Spencer Creek (road) i.e. feathering effect
- hand or machine pile slash concentrations (avoid excessive ground disturbance)
- orange mark to reserve any healthy DF, PP, WP, SP and IC understory trees
- reserve all snags except hazard trees

Riparian Reserve LUA, aspen restoration area (approximately five acres)

- Patch cut and density management, orange leave tree mark
- cut all conifers less than 24 inches dbh except healthy PP, SP, WP, and DF
- orange mark to reserve, any healthy DF, PP, WP, SP and IC understory trees
- fall trees uphill (away from Spencer Creek)
- yard trees 8 inches and larger dbh to 38-5E-12.0 road with cable
- hand cut, lop and scatter residual fuels and trees smaller than 8 inches dbh
- arrange fuels to protect live aspens larger than 8 inches dbh and livestock fence
- broadcast burn slash to stimulate aspen sprouting
- exclude grazing for at least three years to promote retention of aspen sprouts
- reserve all snags except hazard trees